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Volume 7 | June, 1943 | Number 9

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JESSE R. HARLAN
Production Manager

BRYANT W. POCOCK, JEFFREY R. STEWART } *Consulting Editors*

C. B. F. YOUNG
Contributing Editor

JOHN M. KRINGS
Advertising Manager

CHARLES H. DEILY, JR.
310 West Durham St.
Philadelphia
Chestnut Hill 1198

RICHARD S. KLINE
431 Main St., Cincinnati
MAin 0182

FRANK J. ENRIGHT
627 Union Commerce Bldg.
Cleveland Main 2866

G. M. FILLMORE
342 Madison Ave., New York
Murray Hill 6-3899

GEORGE H. MEYERS
Tribune Tower, Chicago
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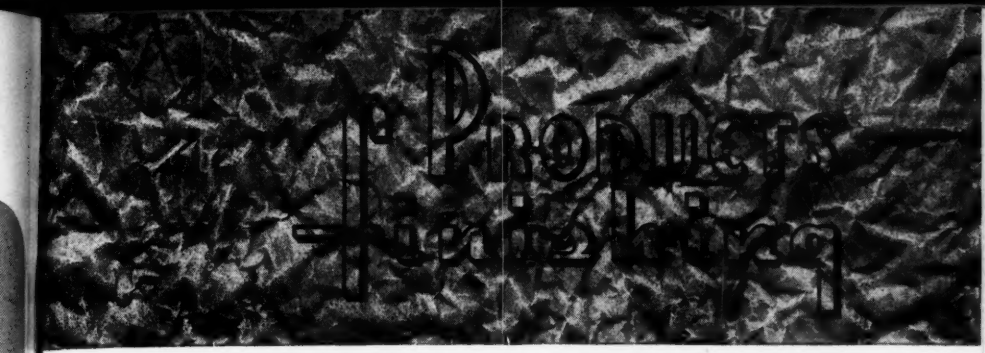


We bring you President Conley's Hearty Greetings to the 31st Annual A.E.S. Convention

ON June 7, 8, and 9, Buffalo, New York, will become the capital of the world, inhabited by that interesting and long-suffering race of the "genus homo" who by accident or design find themselves egaged in the science of electrodeposition and its allied arts. For the 31st time in as many years, without a break, the pilgrimage will be made by the faithful who thirst after knowledge and look forward to an exchange of friendships and ideas at the supreme "Pow-wow."

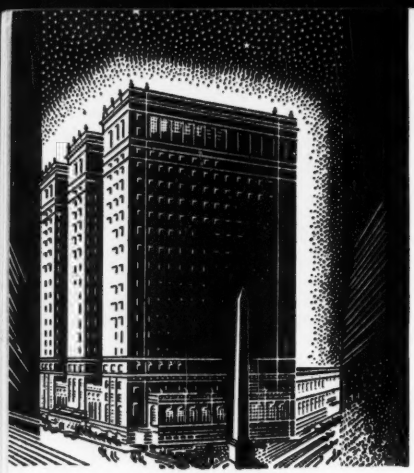
Meetings of the American Electroplaters' Society have always been singularly successful, and this one will be no exception. The reason is readily apparent. Like the man who made a better mouse trap, those responsible for the A.E.S. Conventions find that a path is beaten to their doorway because each year they have offered the best in education, entertainment and good fellowship. No other organization has succeeded in capturing greater spirit than the one that permeates a convention of the A.E.S.

This year the Buffalo committee has packed a four-day convention into a three-day period without leaving out a single essential. The papers to be presented have all been chosen for their timeliness and applicability to wartime needs. Uncle Sam has called on the electroplater to perform some amazing feats. You'll hear about them at Buffalo in June.

This is enough to insure a successful convention, but there's more. Leaders in the electroplating industry will be there. Many of your friends will be looking for you. You can work out your problems around a table, over a good luncheon, out in the lobby in the wee small hours, or in the convention hall during the question periods where everyone may have his say. And, lastly, you will be supporting the organization that has helped to accomplish a great deal for the industry over the past 31 years.

Employers should make every effort to arrange the schedules of their key men who are directly concerned with electrodeposition and metal finishing to include these three days in Buffalo. Shop owners should be there in order to keep abreast of these strenuous times. Where possible, the entire staffs will profit by combining a few days of intensive, educational activity with a bit of relaxation from the daily grind.

Charles C. Conley, President
American Electroplaters' Society



Official Program of A. E. S. 31st National Convention

Buffalo, New York, June, 1943
Hotel Statler, Convention Headquarters

Sunday, June 6th

3:00 P. M. Registration—Main Floor, Hotel Statler
Registration fees: Men, $5.00; Women, $5.00. This fee entitles the registrant to a book of tickets to be used for all A.E.S. functions and activities. Membership in the Society is not necessary for registration.

Monday, June 7th

8:00 A. M. Registration—17th Floor Lobby, Hotel Statler
9:00 A. M. Opening Session—17th Floor Auditorium, Hotel Statler
Invocation: Rev. Frank C. Mesle
Welcome to Buffalo: The Honorable Joseph Kelly, Mayor
Response: Dr. Christian J. Wernlund, General Chairman
Greetings from the Buffalo Branch: Joseph Ruff, President
Presidential Address: Charles C. Conley, President, American Electroplaters' Society
10:00 A. M. First Educational Session, Joseph Ruff, Presiding
2:00 P. M. Second Educational Session, Horace Smith, Presiding
8:00 P. M. International Fellowship Club—Open House — Terrace Room, Hotel Statler

Tuesday, June 8th

8:30 A. M. Third Educational Session, W. M. Phillips, Presiding
12:30 P. M. Victory Luncheon—Dr. Frederick A. Hodge, Speaker—Terrace Room, Hotel Statler
2:30 P. M. Fourth Educational Session, Charles Clindinin, Presiding
8:00 P. M. Fifth Educational Session, F. C. Mesle, Presiding

Wednesday, June 9th

8:30 A. M. Sixth Educational Session, J. Acheson, Presiding
2:00 P. M. Annual Business Session — Election of Officers, Selection of 1944 Convention City
7:00 P. M. Banquet and Dinner Dance—Grand Ballroom, Hotel Statler—Floor Show, Drawing of Prizes

Educational Program for Victory — Sessions Held in the 17th Floor Auditorium of the Hotel Statler

Monday Morning — June 7, 1943 — 10:00 A. M.

JOSEPH RUFF, President, Buffalo Branch, Presiding

"The Effects of Government Restrictions on The Electroplating Industry"

WM. McCORD, *War Production Board*, Washington, D. C.

This paper will give a bird's-eye view of how government restrictions have affected the electroplating industry during the past year and what further changes are in the offing. The expansion of current plating requirements in various lines and possible new applications of electroplated finishes will be of particular interest. Mr. McCord's estimate for the future of electroplating during wartime should be particularly timely and helpful.

"A Report on the Relation of Electroplating to the Military Requirements"

WM. BLUM, Ph. D., *U. S. Department of Commerce, National Bureau of Standards*, Washington, D. C.

Dr. Blum will review a wide variety of applications of electroplating in connection with specific military requirements. His broad experience and intimate knowledge as regards the needs of the war industries enables him to present a widely diversified factual picture of what lies ahead for the electroplaters of America.

"The Plating of Manganese on Other Metals"

C. L. MANTELL, Ph.D., *Consultant*, New York, N. Y.

Dr. Mantell's contributions to the development of the electrolytic large scale production of manganese makes this subject of unusual interest. This paper first reviews the major obstacles encountered in the electroplating of manganese on other metals for both protective and decorative purposes. This is followed by a description of the type and character of deposits obtainable and the present and prospective utility of these deposits. A new unique plating process may soon be available. The abundance, cheapness and unusual properties of manganese make this paper of outstanding significance.

Monday Afternoon — June 7, 1943 — 1:45 P. M.

HORACE SMITH, Newark Branch, Presiding

"The Cronak Process"

E. A. ANDERSON, *The New Jersey Zinc Company*, Palmerton, Pennsylvania

This paper will consider the Cronak process from the standpoint of both procedure and performance. It will attempt to answer the questions as to why certain steps in procedure are acceptable while others are not. It will also attempt to clarify the question of what can be expected from the film in service performance.

"The Electrotinning of Strip Steel with the Crown Cork and Seal Company's Process"

W. B. COOPER, *The Crown Cork and Seal Company*, Baltimore, Maryland

The development of the electrotinning process on steel strip is a unique engineering achievement which promises to be duplicated with copper, lead, zinc and other metals after the war. Electroplating will thus tend to concentrate in large scale production units. This paper will review the electrolytic process and illustrate some of the mechanical problems encountered in putting the strip plating process into continuous high speed production.

"Solving Burring Problems"

F. W. ROCK, *The Roberts Rouge Company*, Stratford, Connecticut

To solve a difficult burring problem in a concern producing vital war items, the Roberts Rouge Company—in cooperation with a brush wheel manufacturer—provided a most effective abrasive compound to adhere properly to relatively coarse wire ends, wire size being 0.005 to 0.010. This successful performance has led to wide adoption of both wire and tampico brush wheels operated at high surface speed as a superior method of removing

burrs and tool marks from various metal parts. The flexibility of such wheels permits all irregular contours, indentations, recesses, as well as flat places, to be contacted fully, leaving a smooth surface with essential dimensions adequately protected.

"Roto-Finish. The Modern Method of Deburring Metal Parts"

F. P. GREEN, *Crown Rheostat & Supply Company*, Chicago, Illinois

Roto-finish is obtained by a process in which the metal parts are rolled in mineral chips and compound in special type barrels. High precision parts and rough castings, whether of steel, bronze, aluminum, zinc or stainless steel, all lend themselves readily to this process. Likewise, the size of parts varies in mass from a gram to one hundred pounds.

"Burring by Flexible Polishing with Greaseless Compounds"

H. L. KELLNER, Ph.D., *The Lea Manufacturing Company*, Waterbury, Connecticut

When parts and burrs are of such nature that they can only be cut by abrasives firmly fastened to revolving wheels and bobs, burring can best be accomplished by polishing. Conventional set-up wheels are used where edges are regular, but with irregular contours, flexible polishing wheels, formed and maintained for continuous operation by frictional transfer of greaseless compound, are indicated.

By selection of wheels, from felt through sewed and loose buffs to string wheels, and the grade of greaseless compound used alone or with a pre-coat frictionally applied, practically any degree of flexibility of the polishing face required by the part in question can be attained.

Tuesday Morning — June 8, 1943 — 8:30 A. M.

W. M. PHILLIPS, Detroit Branch, Presiding

"Plating with Black Nickel"

WALTER E. MOLINE, *The National Cash Register Company*, Dayton, Ohio

Starting with a standard bath, each of the components has been varied separately and their effect upon the final deposit noted. Other optimum operation conditions—i.e., current density, pH and temperature—have also been established. Charts and graphs are included covering most of the variables. Low ammonium sulfate concentrations are to be avoided, while variations in pH from 5.0 to 6.2 apparently have but little effect. Kodachrome slides of various test panels are included to bring out visually conclusions reached by the author.

"Rapid Silver Plating"

R. A. SCHAEFER and J. B. MOHLER, *The Cleveland Graphite Bronze Co.*, Cleveland, Ohio

A new high pH cyanide silver bath was developed for the rapid electrodeposition of silver at a cathode current density of approximately 100 amperes per square foot. The bath was found to give a dense and ductile deposit and consumed a small quantity of chemicals per pound of silver deposited under rapid plating conditions. Cast silver anodes of approximately 99.9 per cent purity were used. These anodes were neither cold worked nor annealed and the electrolyte was found to be less sensitive to anode impurities than the conventional silver plating baths.

"Study of the Adherence and Corrosion Resistance of Silver Plate on Steel"

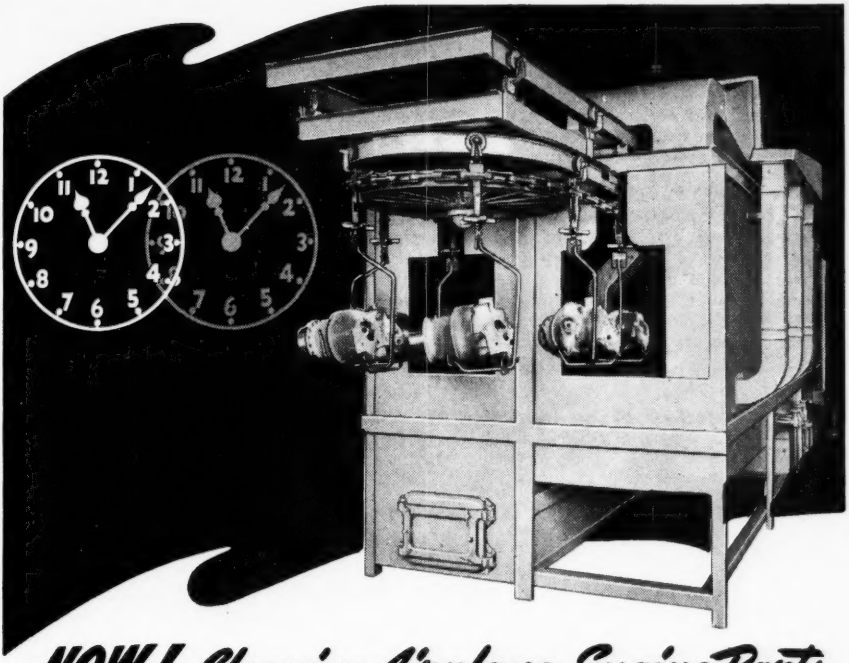
F. C. MESLE, *Oneida Ltd.*, Oneida, New York

Mr. Mesle's paper will deal briefly with the adherence of silver when plated directly on steel with the usual silver strike foundation coating, and the influence of heating on adhesion. The author will then give his experience with phosphate coatings under the silver and their influence on adherence and corrosion. In conclusion he will review his experiences with silver as a protection against corrosion on ferrous metals. This paper calls attention to simple yet basic facts of vital concern to all those interested in the newer uses for silver plate.

"Powder Metallurgy and Its Relation to the Electroplating Industry"

J. F. KUZMICK, *Stevens Institute of Technology*, Hoboken, New Jersey

This paper describes the manufacture of metal powders and their fabrication into useful molded products. Some of the products made by this process are tungsten lamp fila-



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"Zinc—Saboteur of Steel at Elevated Temperatures"

F. PAGE, JR., *Solar Aircraft Company*, San Diego, California

This paper calls attention to the embrittling effect of molten zinc on highly stressed steels and the hazards this entails. As little as one milligram of zinc in contact with stressed stainless steel at 1,400 deg. can cause cracking. Other steels, for example, S.A.E. 2330 and S.A.E. 4130 show a similar weakness in combination with zinc. Exhaust manifolds fastened with zinc plated bolts are liable to failure with possible loss of aircraft and crew. The data are illustrated by a motion picture supplied through the courtesy of The Solar Aircraft Company.

Tuesday Noon — June 8, 1943 — 12:30 P. M.

VICTORY LUNCHEON

Hotel Statler — Terrace Room

DR. FREDERICK A. HODGE, Speaker

This luncheon is a special feature where good fellowship can be enjoyed to the full. Dr. Hodge, the speaker, is a well-known commenator who has devoted his time exclusively for the past five years to writing and speaking. A keen analyst, a man of deepest culture and fullest education, Dr. Hodge brings to the platform a fascination born of profound scholarship and acute discernment. He is a graduate of the University of Virginia and formerly was an instructor in Philosophy and Education at that university and in other southern colleges. During the first World War he entered the chemical engineering field with the du Pont Company.

Tuesday Afternoon — June 8, 1943 — 2:00 P. M.

CHARLES CLINDININ, Chicago Branch, Presiding

"The Hard Chrome Plating of Cutting Tools"

AUSTIN F. FLETCHER, *The Brewer-Titchener Corporation*, Binghamton, New York

The solution composition and operating technique employed in the hard chrome plating of cutting tools, such as drills, reamers, taps, tool bits, and so on are described, including preferred methods of racking and of handling the work before and after plating. The actual amount of increased production and tool life realized by a given thickness of chrome plate shows what can be accomplished along these lines.

"Porous Chrome"

H. VAN DER HORST, *The Van der Horst Corporation of America*, Olean, New York

This paper deals with the Van de Horst process of porous chrome plating engine cylinders and piston rings. The process serves to reduce cylinder wear, ring wear, ring groove wear and in general tends to a more reliable engine. It also serves to reclaim worn aircraft cylinders. The chrome deposit must be porous for lubrication purposes because ordinary dense chrome does not wet with oil.

"Racking in Hard Chrome Plating"

A. W. LOGOZZO, *The Hartford Chrome Corporation*, Hartford, Connecticut

This article deals with the fundamental principles of the mechanics of hard chrome from the practical plater's standpoint. Simple and effective racks will be illustrated, including auxiliary anode hook-ups.

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"Installing Equipment to Obtain the Greatest Amount of Automatic Control and Handling"

G. E. HUENERFAUTH, *Crown Rheostat and Supply Company,* Chicago, Illinois

Due to the development of high current density, plating solutions which require closely controlled operating conditions—and other electrolytic processes, automatic controls and uniform treatment have become very important. By keeping these facts in mind when making new installations, it is easy to obtain simple but effective layouts at a nominal cost.

"Industrial Salvage by Electrodeposition"

OVIDE G. HOGABOOM, *The New Britain Machine Company,* New Britain, Connecticut

This paper deals with reclaiming over-machined and worn parts by heavy electrodeposits of copper, nickel, chromium, or iron directly on the base metal. Many diagrams are given to show how to set up various machine parts for plating inside and outside dimensions, not only for pieces which fit into the baths but also for work larger than the tanks themselves. These sketches clearly illustrate the special technique used and the simplified racks for many common jobs and those that are irregular and intricate. This interesting paper closes with pictures of shafts reclaimed by electrodeposited iron.

Tuesday Evening — June 8, 1943 — 8:00 P. M.

F. C. MESLE, Syracuse Branch, Presiding

"Radiant Gas Heat in Baking"

C. P. MANN, *The Selas Company,* Philadelphia, Pennsylvania

The advantages and limitations of radiant gas heat are reviewed and compared with infra-red and convection heating. The applications of radiant gas heat include baking and curing varnishes, lacquers and plastics, baking of food products, fusing dusted powders and heat flowing tinplate. A discussion of drying rates, speed of work travel, temperature ranges, and other equipment problems is also included.

"Infra-Red Applications in Wartime Industry"

W. S. CRANDALL, *The Fostoria Pressed Steel Company,* Fostoria, Ohio

This paper will briefly describe the operation and advantages of infra-red heating. This will be followed by specific application descriptions on dehydration, drying, preheating and baking.

"Industrial Paint Coatings"

W. H. LUTZ, *Pratt & Lambert, Inc.,* Buffalo, New York

A review of paint products used for the production finishing of metal surfaces in industrial plants. Each of the common finish types is evaluated on the basis of raw material composition, general characteristics, and protective qualities. These types include oil paints; phenolic, alkyd, urea, vinyl and acrylic compositions, and nitrocellulose lacquers. Metal pretreatments prior to finishing, finishing procedures and baking processes are outlined.

"The Black Oxide Treatment of Steel"

WM. H. PRICE, JR., *Mitchell-Bradford Chemical Company,* Bridgeport, Connecticut

Especial importance is now attached to the commonly-known "black oxide" surface treatment of steel (copper and brass) because of the diminishing supply of the more conventionally used copper, zinc, chromium, cadmium and nickel—and therefore the criticalness of these formerly used protective platings.

Although low in salt-spray test resistance, laboratory research and—more important—actual field testing under practical use conditions are determining that this treatment of steel has wide and increasing effectiveness and usefulness among hundreds of war production items. Adaptable for use with easily-dispersed coatings of oil or wax, it also provides a splendid bonding medium for paints, lacquers and enamels.

"Blackening of Ferrous and Non-Ferrous Metals"

WALTER R. MEYER, Ph.D., *The Enthone Company,* New Haven, Connecticut

Methods are discussed for the blackening of iron and steel by treatment in fused salts. Treatments for producing black coating upon zinc, cadmium, copper, nickel, aluminum

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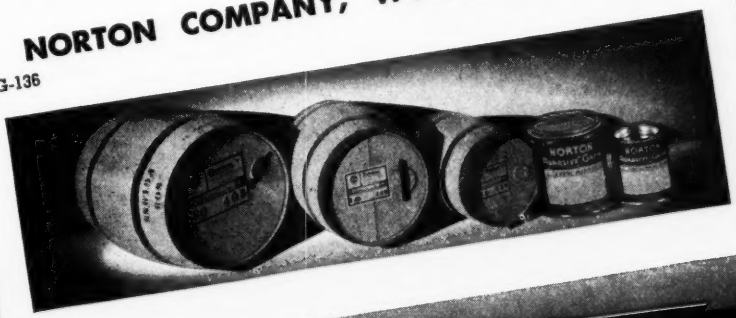


NORTON ABRASIVES

and their alloys are described. Considerable treatment is given ammoniacal copper solutions for blackening brass. The effects of variations in solution composition and the alloy being blackened are discussed.

New information on black nickel plating, such as the effects of pH, current density, temperature, is given. Recent tests on the composition of black nickel deposits are presented.

Wednesday Morning — June 9, 1943 —8:30 A. M.

J. ACHESON, Toronto Branch, Presiding

"Plating Test Control of Plating Baths"

F. MacINTYRE and R. O. HULL, *The du Pont Company, Electroplating Division,* Cleveland, Ohio

This paper describes the means for controlling the common plating baths by determining the behavior of a solution sample in a specially designed small plating unit, the Hull Cell. Plating tests can be made the basis for establishing the optimum concentrations of both the primary bath constituents and addition agents, and the effects of bath impurities, decomposition products of addition agents, accumulation of carbonate (in cyanide baths), physical variables as temperature, agitation and pH.

"The Rate of Saponification in Metal Cleaning—A Preliminary Study"

E. M. BAKER, Ph.D., and R. TWYNING, *University of Michigan,* Ann Arbor, Michigan

This paper deals with the rates of saponification of the constituents in the binder or greasy materials in polishing and buffing compositions and the effects of the soaps formed on the saponification reaction.

"The Effects of Various Anions in Metal Cleaners"

E. C. RINKER, *Oakite Products, Inc.,* New York, N. Y.

The compositions of various types of alkaline soak cleaners are described and the results obtained in removing various grease films are charted. The use of acid cleaning compound is reviewed and illustrated with photo-micrographs. Preferred methods of cleaning aluminum before spot welding to provide low surface sheet-to-sheet resistance are described. The results obtained are illustrated by a chart for Alclad surfaces cleaned in proprietary non-etching acid-type cleaners.

"The Operation of Modern Degreasers"

R. J. DAMMERS, G. S. *Blakeslee & Company,* Chicago, Illinois

The paper will consist of a discussion on the parts cleaned prior to plating and the different types and kinds of surfaces which are encountered, the various oils and greases to be removed, and the effect of heat on these, due to cutting, drawing, shaping and so on. This paper concludes with a brief resumé of the equipment in current use in handling present-day cleaning problems.

"The Practical Aspects of Plating Aluminum with the Krome-Alume Process"

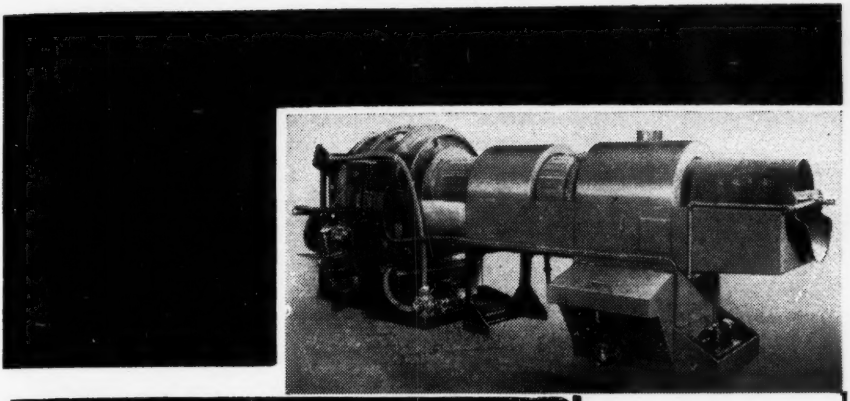
RAYMOND F. YATES, *Krome-Alume, Inc.,* Lockport, New York

This paper deals with plating on aluminum from the standpoint of the "man in the shop" with a full discussion of the common problems as they relate to successful depositions of nickel, chromium, copper, silver, cadmium, and so on. Special emphasis will be laid on the plating of the various dural alloys, the most difficult to plate of the aluminum series. The paper will also deal with the special applications of the process as they relate to plating aluminum with brass for rubber adhesion, pistons for wear resistance, copper for soldering and silver for low resistance to ultra-high-frequency radio currents.

"Commercial Electroplating Past and Future"

E. W. COCHRAN, *The National Cash Register Company,* Dayton, Ohio

This paper calls attention to the need of post-war planning in the electroplating industry with the suggestion that the efficiencies and speeds of some plating processes should be materially improved. The possibilities of greatly improved electrodeposits as regards brightness, throwing power, porosity and ductility are brought down to specific cases. The need for coloring these deposits, the deposition of new alloys, and the expansion of plating processes are also discussed.



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The History of Electroplating

By BRYANT W. POCOCK

Part 3—Prehistoric Chemistry

THE origin of the solar system was the first chemical reaction in a laboratory comprising the universe. Some two or three billion years ago our sun drifted on through space unattended by its present family of planets, comets and meteorites, soaring through the vast emptinesses between other thousands of millions of similar suns which make up what we now know as the Milky

Way galaxy. Our sun at that time probably was not, astronomically speaking, far from its present distance of 35,000 light years from the galactic center. But the mutual gravitation between it and another relatively near-by sun, or star, drew them both closer and closer together until it became apparent that they would either collide or pass each other so closely that they would never be the same again. They were not destined to collide, however, but the nearness of their approach was to leave its mark upon them forever.

As the other star—the invader—passed by our sun, the mutual gravitational fields of the two bodies were tremendous. Enormous tidal waves were set up within the sun, as was doubtless true also of the invader; huge masses of the sun's substance were ripped out and away, and following the motions imparted to them by this Brobdingnagian encounter set up elliptical orbits about the sun, cooled, and became planets. Thus was born our solar system, according to the Tidal Hypothesis of Jeffreys and Jeans.

Whether the above explanation is accepted or more credence is placed in the alternative Nebular Hypothesis of Laplace or Planetesimal Hypothesis of Chamberlin and Moulton, it is certain that the birth throes of the solar system were gigantic, and that they occurred between two and three thousand million years ago.

Gargantuan as such a disruption must have been, it would be inadequate to ascribe to such changes exclusively the word physical. Granted that such forces were unleased as the world itself has never seen, it is also evident that simultaneous chemical changes took place on a colossal scale. All of the ninety-two chemical elements comprising our world and everything in it were born at that time. They bore less resemblance to their present state than an infant does to an old man. They were uncombined; they did not exist as true elements at the enormous temperatures and pressures concomitant with their severance from the sun—nevertheless the building materials themselves were there, and most of the changes which they were forced to undergo during the last two or three billion years have been chemical changes. The primordial elemental protoplasm had to be relieved of its high temperature and pressure. Gaseous elements eventually resulted, liquids gradually appeared, and the solid crust of the earth upon which we live took shape. By this time thousands of compounds had been formed.

Such was the first and largest chemical display of any immediate significance to mankind. Beside it our paltry contemporary reactions are as nothing. We are accustomed, for example, to a one-gram or possibly a half-gram sample for a complete chemical analysis or synthesis. The mass of the earth in comparison is 5.983×10^{24} kilograms, that of the sun from whence the earth and all the other planets came is 329,390 times the mass of the earth, and the total mass of the galaxy is calculated at more than 10^{11} times that of the sun.

Approximately 300 million years ago, which is as "but the twinkling of an eye" in the story of a universe, the thousands upon thousands of chemical compounds formed by the proximity of some 6.6×10^{21} tons of matter had cooled to a degree which enabled them to combine in yet another way.

The solid crust of the earth was fairly well covered by a thick blanket of water. The oceans of the world were being formed. Coincidently with the gradual delineation of the continents by the wrinkling process of a shrinking earth, and with the slowly forming contours of the seven seas, there was going on within those seas

OVER 5000 POUNDS OF ...IN ONE PLANT WITH

EVERY POUND of essential metal saved is a blow against the enemy. Pennsalt Cleaners are doing forthright service in many industries, helping to conserve vital time and materials by faster, better metal cleaning—at lower cost.

Saving zinc by the proper removal of oil, grease and other soils from structural steel before galvanizing is an example. In one large fabricating plant rejects after galvanizing ran 20 to 25 per cent before Pennsalt Cleaners were introduced.

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Now for the Pennsalt method:—Crates of steel parts are lowered by crane into a tank containing a steam-heated solution of Pennsalt Cleaner. After ten minutes they are taken to a rinse tank, then as they are removed they are water-sprayed. Pickling, rinsing, fluxing and coating operations proceed as before.

Result? Virtually *no* rejects! Average daily production up 20 per cent! And the zinc formerly lost due to stripping rejects now is *saved at the rate of over 5000 pounds per 80 hour week!* Over 260,000 extra pounds a year to help win this war. And this saving was made by only *one* manufacturer!

Many leading plants in every field of metal manufacture are saving needed materials and speeding cleaning operations with Pennsalt Cleaners. They are often able to dispense with hand labor and precleaning . . . and so cut cleaning costs.

In a wide range of duties, Pennsalt Cleaners are removing and preventing the redepositing of dirt—grease, oil, emery dust, rouge, carbon smut, grit. The metals and alloys they clean include carbon and alloy steels, stainless steel, copper, aluminum, zinc, nickel, nickel silver, Britannia metal, brass and bronze.

Whether the part is rolled, forged, stamped, drawn or cast . . . Pennsalt Cleaners are producing a remarkably clean, smooth surface that leads to a better job of Bonderizing, Parkerizing, enameling, painting, galvanizing or plating.

In the complete series of Pennsalt Cleaners, there is one which will meet the specific metal cleaning problem in *your* plant. All Pennsalt Cleaners have exceptional dissolving and emulsifying action, extraordinary lasting power and highly efficient cleansing qualities.

Let one of our experienced technical staff help you choose the Pennsalt Cleaner that will do most to save time, materials and money in your particular metal cleaning operations. Or write fully to our Pennsalt Cleaner Division, Dept. P.

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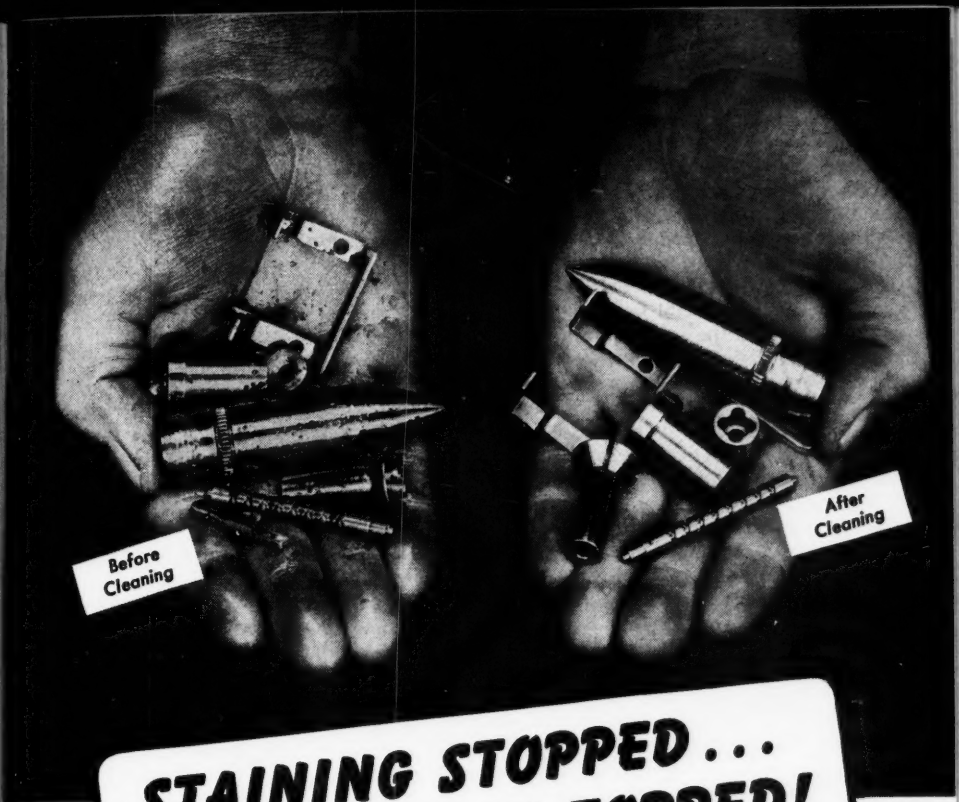
a new and wonderful thing.

Large and complex molecules, which had formed by the relatively simpler processes of aggregation and mutual attraction, happened to combine in such a way that subsequent combinations became easier. That the molecules themselves were aware of this fact would not be true as we understand awareness today. But they were aware of it in one sense, because the subsequent, easier reactions of the molecules tended to develop an awareness. This awareness might have been simply a mechanical, pebble-in-the-groove repetition — the early law of nature that a thing once done is easier to do again. But consciously or not, the reactions multiplied.

The new type of molecule found chemical conditions suitable for further reactions involving inevitably a continued growth in the size of the molecule. This could not go on indefinitely, however, for certain reasons existed whereby a size limitation became essential. The new molecule, born in an aqueous medium, was bound to retain some of the properties of the medium. It was probably protenoid in character and undoubtedly maintained the flexibility of a fluid. It was unsaturated in its ability to add to itself from its surroundings. Its center, however, could only react with the molecule's environment when interior currents swept the central portions to the surface. Surface position, therefore, became a premium position, and a condition was established whereby the interior portions of these molecules were enabled to enjoy maximum surface position in point of time. This requirement was met by a restriction in size, the idea being that the volume of a sphere (hence the mass of a uniform sphere) increases as the cube of the diameter, whereas the surface area increases only as the square of the diameter.

The molecules found compensation for their restricted size when bits of them broke off and enlarged (by surface aggregation-synthesis) into new

"Some of the Troglodytes, more curious than the rest, observed from a safe distance that fire will burn itself out, once it has nothing further upon which to feed . . ."



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molecules like the original. Pattern reactions and reproduction were discovered. Life had come to the earth.

The late Professor Aldred Scott Warthin was wont to define life as a chemico-physical complex consisting of the manifestations of an unstable, unsaturated, perpetually unsatisfied protenoid molecule. It was a far cry from these first exhibitions of a primordial ooze to the more complicated reactions of the Troglodytes of Périgord—a cry of 300 million years. Yet it is certain that from the appearance of the first protenoid molecule to the development of these subhuman cave dwellers, nothing was so much involved in the slow, plodding integration of life and its associated phenomena as the complicated and ever more intricate chemical reactions of a waxing evolution.

All available evidence indicates that human-like creatures, the probable forerunners of present-day species, inhabited and enlarged the natural caves and caverns of the earth at least 300,000 years ago. Our knowledge of these more-beast-than-men is lost in the dim annals of an only partially readable antiquity: of their civilization we know less than nothing. Nevertheless, we can guess a great deal, probably most of it quite accurately.

We are sure, for example, that the Troglodytes spent most of their time hunting and fighting. Whenever they had a few moments' relaxation from these strenuous duties, upon the vigorous prosecution of which their very lives were contingent, they probably worked on what few relics we have been able to uncover and study. We feel positive that they were nearly as savage as the beasts they hunted. We are certain that they were superstitious.

Whenever they witnessed with their own eyes the wonderful manifestations of the greatest single chemical reaction of which they were cognizant, most of them probably ran in terror. A few sporadic instances undoubtedly occurred, when some of their number, more curious than the rest, observed from a safe distance that fire will burn itself out, once it has nothing further upon which to feed. The more superstitious took this to mean that fire must be fed and, inasmuch as it was obviously of supernatural origin, it were better to placate it with voluntary contributions of meat and berries, in the hope that the fire god would find these more palatable than their donors. The more inquisitive learned to control fire and enslave it.

The mastery of fire and of its use for cooking meat, warming caves and frightening off wild animals developed independently all over the inhabited globe. Some tribes learned these things earlier than other tribes, yet we have knowledge of no primitive community without some acquaintanceship with fire.

The knowledge of fire and its application to the manifold problems of existence induced men to band together and establish communal dwellings. Central fires were kept going for the cooking of tribal meat. It was found expedient to live close together, for when one's own fire went out one could get some from his neighbor. It took less work per capita to protect a community than to protect one's family. Thus came about the beginnings of civilization—a civilization which was destined to have its ups and downs in a world of endless change.

Anodex Reverse Current Process is the subject of a four-page illustrated folder distributed by MacDermid, Incorporated, Waterbury, Conn. The Anodex Process, a method of electro-cleaning prior to finishing or plating, and Anodex Compounds used with the process are clearly described. Copy of the folder available upon request.

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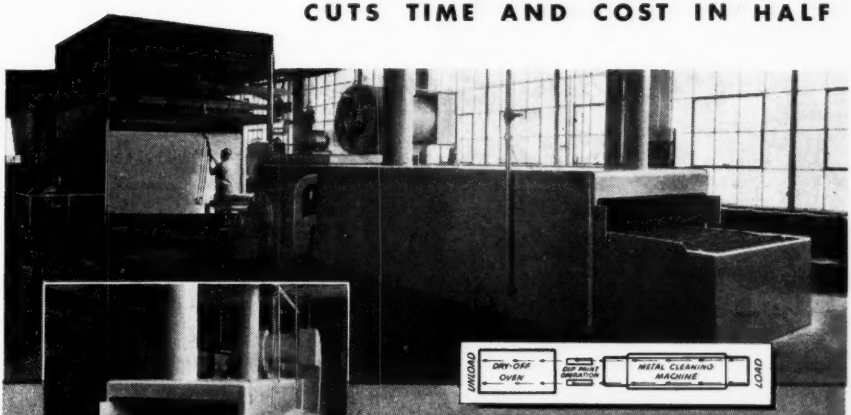

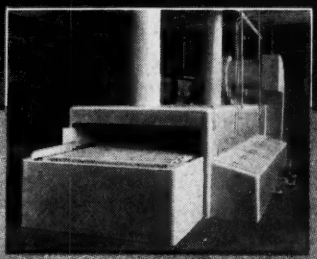

TOP: Complete installation. Showing unique line progression. Cleaning machine, with power-rise conveyor, unloads a product, each a different size and shape.

BOTTOM: Unloading area. Overhead conveyor, Monitor Automatic welding machine and operator, all easily accessible.

● The unprecedented demands of war have taxed the resources of the Mahon organization to the utmost to design, build and install—in record time—equipment that would handle efficiently and economically enormous production schedules. But saving time and money is just as vital to those manufacturers whose production is of a more moderate size. In scores of such cases, Mahon engineers have cooperated to the fullest possible extent. The installation of finishing equipment, pictured here, is a typical example. This company, The Motor State Products Company, Ypsilanti, Michigan, manufactures three essential products, each a different size and shape. Their problem was the procuring of finishing equipment that would effectively handle all three. Cooperating with the company's engineering staff, Mahon engineers developed and installed a specially-designed metal cleaning machine and a dry-off oven, with handling equipment for a dip painting process located between. In this installation three important things stand out. Initial expense was gratifyingly small. Production time and cost was cut better than half. Only four men now are required to handle all finishing operations.

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The Flexibility of the Cuprous Oxide Rectifier for Automatic Control Equipment in Electroplating

By G. E. HUENERFAUTH
Crown Rheostat & Supply Company, Chicago, Illinois

The electroplating industry has expanded rapidly during the past 15 years. Today plating tanks hold several thousand gallons of electrolyte. High standards specified for plated articles make automatic control a very essential feature. It is shown that the cuprous oxide rectifier permits of a wide variety of current-voltage combinations, practically impossible with the motor-generator, making the rectifier especially suitable in automatic control mechanisms for electroplating and anodizing.

Introduction

THE plating industry of 25 years ago was one of small tanks of a few hundred gallon capacity each. Current densities applied at that time were usually less than 10 amp./sq. ft. (1.1 amp./dm.^{2}). The standard practice was to connect several tanks to one large motor-generator set and use individual tank rheostats for control of current or voltage of each tank. The early rheostats were later replaced by a parallel multiple-switch type with better and closer regulation.

But in the last 15 years the plating industry has changed to one of large tanks holding several thousand gallons each. And current densities have increased to several hundred amperes per square foot or more. This change has been brought about by the development of chromium plating, the low pH nickel bath, anodizing processes, electrolytic descaling, electrolytic polishing, and the use of large automatic conveyor equipment. These developments not only required better control, but today high standards of war work have made automatic control a very essential feature.

When automatic plating control was first tried under the old scheme of connecting several plating tanks to one motor-generator, the regulating mechanism had to be applied between tank rheostat and tank. Therefore, if a tank required 2,000 amp., the control apparatus and mechanical parts had to be relatively large. Switches of 2,000 amp. size were not only costly, but in most cases had to be built to order. Later the tank

rheostat was eliminated by the use of a motor-generator of the proper size connected directly to each tank. There were two advantages gained—that of eliminating the tank rheostat, and of variable voltage control. On the separately excited motor-generator set, a motor-driven field rheostat could be used on the field of the generator and controlled by a series of switches, relays and timers to give automatic increase or decrease of voltage.

In the last few years cuprous oxide rectifiers have become a source for low voltage d.c. current. They offer a convenient method of changing high voltage a.c. power current to low voltage d.c. current for plating, anodizing and other similar processes in place of a motor-generator set.

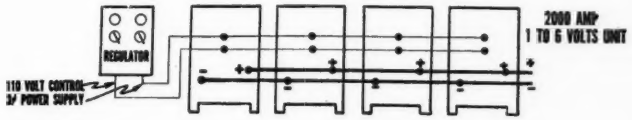

Fig. 1

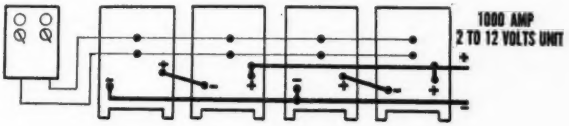

Fig. 2

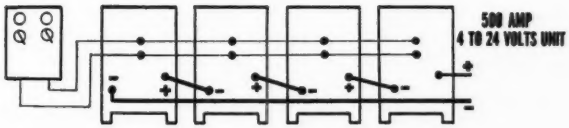

Fig. 3

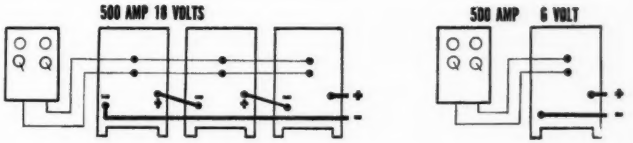

Fig. 4

One style of construction of the copper oxide rectifiers is a unit package type of 300 or 500 amp., 6-volts each. The fact that rectifier sections can be easily paralleled or run in series with each other is similar to that of connecting together a number of dry cells. Thus, instead of using one large unit, sections of a

unit can be connected at different intervals, making it possible to raise the amperage or voltage as desired. This regulation is on the a.c. or high voltage-low amperage side instead of

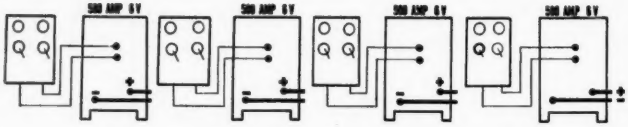

Fig. 5

the d.c. or low voltage-high amperage side of the unit. Due to the difference in amperage between the a.c. and d.c. side, the a.c. allows the use of smaller stock size contacts at a lower cost.

When cuprous oxide rectifiers came into use, they were, and still are, built in large units such as 500, 1,000 and 2,000 amp. ratings, the same as the ratings of motor-generator sets. Thus they offered the same problem in working out automatic control. In addition to these large single rectifier units, there are the package units built in 300 and 500 amp. sizes, with which we will show some of the possibilities for automatic control equipment.

All cases of automatic control must be studied individually. Let us take a few cases for illustration, keeping in mind that some of the conditions used are to illustrate the possibility of the rectifier and not necessarily an actual condition. In all of the following cases we will use a unit "package" of 500 amp., 6-volts. By taking four of these units they can be connected in the following ways:

(1) All in parallel, giving 2,000 amp., 6-volts (Fig. 1).

(2) Divided into two sets, each set being connected in series, and then the two sets connected in parallel giving 1,000 amp., 12-volts (Fig. 2).

(3) All placed in series to give 500 amp., 24-volts (Fig. 3).

(4) Three units in series to give 500 amp., 18-volts (Fig. 4) with a 500-amp., 6-volt unit idle.

(5) Each unit used singly, giving four 500-amp., 6-volt units (Fig. 5).

Of course, the larger the rectifier unit required, the greater the number of individual units used and a greater number of combinations that may be had. The amount of a.c. power used on each unit is about the same as a 5 h.p. motor so that cutting these units in and out of a circuit would be similar to a series of 5 h.p. motor used on an automatic machine tool, as to the load on the line and the size of contractor relays required.

The most common control is that of a definite time cycle in order to obtain a predetermined thickness of plate at a prescribed current density. Each rectifier has a small magnetic starter, the same as a Size 1 motor starter with 110-volt, single-phase coil built into it. This allows the use

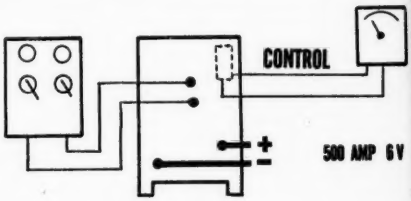

Fig. 6

of 110-volt, single-phase current for a control circuit. By placing a delayed relay, or timer, on this 110-volt coil, which has a very small wattage consumption, the circuit can be shut off at the end of a given time. Thus the d.c. treatment can be stopped and a warning light or bell given the operator to change the load. Thus the operator, on placing the load in the tank, would press a button starting

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the cycle and then upon its completion would be warned to remove it from the tank (Fig. 6).

NICKEL PLATING. In plating barrel operations, if the current demand for a cylinder were 400 to 500

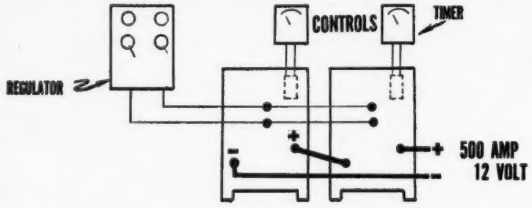

Fig. 7

amp., an individual rectifier could be connected direct to each cylinder. By placing a limit switch so that the cylinder would come in contact with it when placed in the tank, the plating would automatically start. At the end of a given time there would be a warning for the operator to remove the cylinder from the tank. Lifting the cylinder off the limit switch would automatically reset the relay. In this manner the operator would be limited to the operations of mechanically lowering and raising the cylinder, and having the d.c. current come on automatically and shut off at the end of the correct time period. Thus a saving of current and metal can be had by not over-plating, yet no chance of under-plating can take place.

If the work were being plated at 12 volts, having two rectifiers in series, the second delay relay could be connected after the first one for starting and controlling the second rectifier. When the cylinder is placed in the tank, the first rectifier unit would come on and the work would be plated at a lower current density for a short time. At the end of this period, the second rectifier would come on, raising the current density, and then at the end of the cycle both units would automatically shut off (Fig. 7).

CHROMIUM PLATING. In hard chromium plating some treatments call for the use of reverse current and then direct current. An electric or air-operated reversing switch could be installed on the d.c. line. This switch would be controlled by the same type of relay as the rectifier. On starting the cycle the work would receive reverse current and then at the end of a predetermined time the switch would reverse the current, allowing the work to receive the direct current and then be automatically shut off at the end of the cycle. Where this type of plating is done to reclaim undersized machined parts, the number of ampere-minutes can be figured and the second timer would be set for the total time of both reverse and direct current and, with the voltage regulator of the rectifier, it could

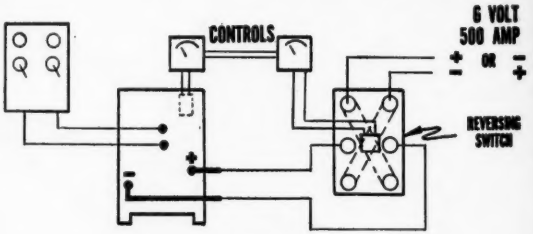

Fig. 8

be adjusted to the amperage required (Fig. 8).

Thus when the work has been placed in the chromium plating tank and the cycle started, it will receive a reverse current for a definite time; then the current will be reversed to deliver a direct current at a given amperage so that when the end of the

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cycle is reached, the work has received a predetermined thickness of plate. If there is a quantity of these parts all receiving the same thickness of plate to be finished, it is only necessary to load and unload the tank and again press the button for the starting of the cycle.

In full automatic equipment the length of time is controlled by the speed of travel through the plating tank. However, it might be desirable to step up the current density in order to obtain a better plate. To do this, in place of the rectifiers being connected into one large unit as the current would be with a motor-generator set, they would be divided into groups. Each group would run at a different voltage, and as the work passed along the tank it would make contact with the various groups, thus receiving a step-up of current. With this groups arrangement, the different groups could be distributed along the machine, making a saving of bus bar over that required if the current came from one central point (Fig. 9).

ANODIZING. The process demanding the greatest amount of automatic control is that of anodizing. In many cases the government specifications call for a definite step-up of voltage and a definite length of cycle. For chromic acid anodizing 42 volts are normally required. For a 500-amp., 42-volt unit, seven rectifiers would be connected in series. On the first unit a standard voltage regulator would be installed to regulate the starting voltage. By using the same delayed relays as above, each rectifier would be turned on—one at a time—with an adjustable delay period between each step. In this way you would obtain seven steps of 6 volts each for control. In the various steps the current from the rectifiers then on would also pass through the dead or idle rectifiers of the circuit.

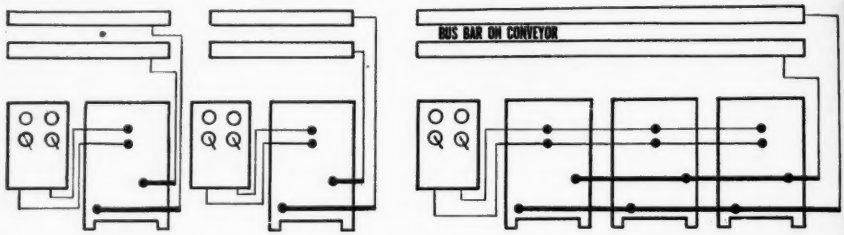
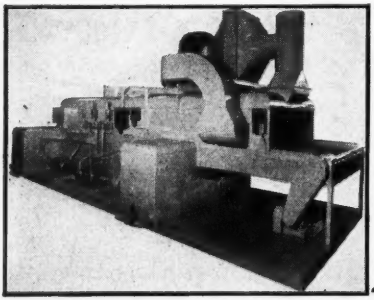


Fig. 9



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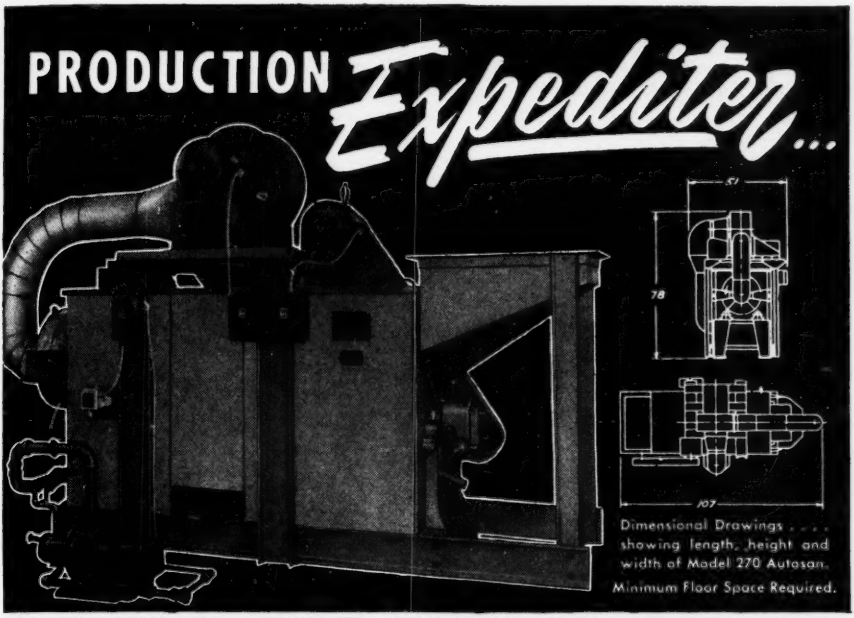

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COLT AUTOSAN METAL PARTS CLEANING EQUIPMENT

Each individual unit can be fused for protection against over-load. Here, again, when the operator places the load of work in the tank, he presses a button for starting the first step. At the end of a minute or two the second rectifier would come on, raising the voltage; as each succeeding rectifier in turn comes on, after a short delay, the necessary thickness of coating is obtained. When the final voltage is reached, it would be held until the end of the cycle, when all seven rectifier units would automatically be cut off and the operator warned. By the use of indicating lights the operator can tell at a glance which rectifier is on and what the voltage is. Also, some types of relays show the amount of time left in the cycle.

If, for any reason, the first step required more than six volts, the first two units would be turned on for the first step and the starting voltage cut by the use of voltage regulators. The final voltage would then be reduced, for example, to 38 volts if the starting voltage was eight volts and you would then have six steps of regulation in place of seven. If necessary to have a full 42-volt final voltage and a high starting voltage, a fixed resistance could be installed between the regulator and rectifier which would give the desired starting voltage, using the two units in series for the first step and reducing from 12 volts to 8 volts, and later by the use of an automatic cut-out, by-passing this resistance so that the full 42 volts could be had at the end of the cycle. With this type of control the following advantages can be had:

(1) An adjustable length of time for the total time cycle.

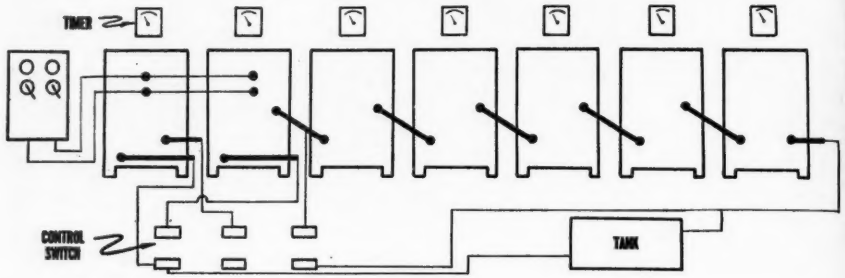


Fig. 10

(2) An adjustable length of time between each individual set.

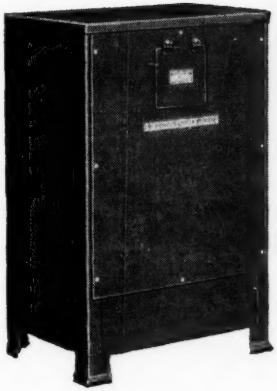
(3) Each individual rectifier protected by fuse or relay against overload.

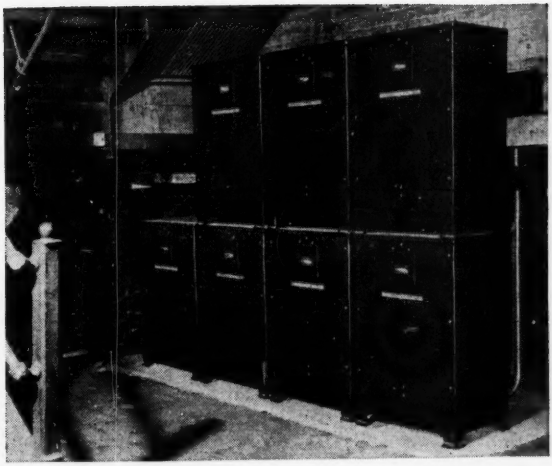
(4) Operator can tell at a glance how far treatment has advanced.

(5) The cycle, once set, can be repeated by momentarily pressing a button.

(6) Operator receives a warning and the cycle is shut off at the end of the time period.

If the amperage demand is near the capacity of the rectifiers on the last step, then there is apt to be an overload from the surge obtained on the first step. This surge may be large enough to overload the rectifiers, causing the fuses to shut them off. There are two ways to overcome this: First, install an electric or air-operated switch on the first two rectifiers so that on the first step they could come on in parallel, giving double the number of amperes at which the unit





A Problem in Electroplating and How It Was Solved

The Problem

An Eastern plating company had a contract for anodizing aluminum parts. The contract would be completed in about 9 months. The job would require a power supply of 500 amperes, 40 volts.

When, if ever, there would be another job requiring 40-volt equipment was uncertain. Most likely the next job would be low-voltage plating requiring 6 volts. The problem was: What equipment would serve both these widely different requirements.

The Solution

Here's how the needed flexibility was obtained: Seven standard 500 ampere, 6-volt G-E Copper Oxide Rectifiers were purchased. By a series connection and regulator control, this equipment was adapted to operate over a range from 1 to 40 volts at 500 amperes. When the contract was completed, the same equipment was relocated at two different points in such a way that 4 units were used for a plating job requiring 12 volts, 1000 amperes, while the other 3 units were set up on a job requiring 6 volts, 1500 amperes.

This illustrates only one of the many electroplating power supply problems that can be solved through flexible G-E Copper Oxide Rectifiers. Whatever your problem, General Electric Metallic Rectifier Engineers will be glad to consult with you. For additional information, write to Section A634-70, Appliance and Merchandise Dept., General Electric Co., Bridgeport, Connecticut.

GENERAL ELECTRIC

would be rated, as in the case of the 500-amp. unit at 42 volts, the first step would be 1,000 amp. at 6-volts. At the end of the first step, this switch would change the units from parallel to series hook-up, and change the maximum current from 1,000 amp., 6-volts to 500 amp. at 12 volts. The other rectifier units would then come on, in their proper sequence, until the full voltage was obtained.

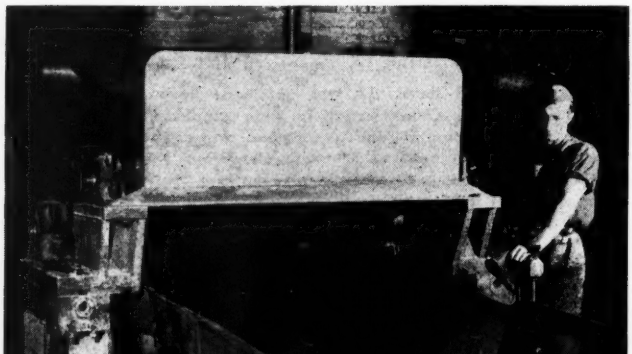
The second way would be to use the eighth rectifier unit in parallel with the first step. When this step came on, this unit would come on in parallel with the first unit of the series. When the second unit came on for the second step, the eighth rectifier unit would be automatically cut out of the line and the remainder of the rectifiers would come on in their proper sequence to give the full load. However, it would be necessary to use a disconnecting switch on this eighth rectifier to disconnect it from the line when it is cut out at the beginning of the second step (Fig. 10).

Sulphuric acid anodizing would use the same arrangement as for chromic acid except that there would be fewer units of rectifiers used, due to the lower voltage required, and this would involve fewer steps of regulation.

Conclusions

The different layouts discussed have shown some of the possibilities of obtaining automatic control by having the d.c. source divided into small units. By the use of any of the various types of timers and relays on the market and controlling the low wattage 110-volt, single-phase current on the magnetic contactor coil already built into the rectifier unit, a great amount of control can be had. This, coupled with the flexibility of the rectifier in parallel and series operation, allows ease in working out automatic control for electrolytic processes not obtained heretofore.

(Paper presented at the Pittsburgh Convention of the Electrochemical Society, April 8, 1943. It is herewith reprinted with the Society's permission.)



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Wrinkle Finishes - What You Should Know

By JEFFREY R. STEWART
Analytical and Consulting Chemist

PART 4

A Discussion and Review of the Most Important Patent Grants

The following article embraces some interesting information which is a result of a patent search made by the author at the U. S. Patent Office in Washington, D. C. The object in this article is to translate the complicated and legal phraseology used in patents into simple terms which may be comprehended by the average layman. The author has made every attempt to make this article authentic and unbiased, and no statement herein should be interpreted as being an endorsement or preference of any one of those discussed in this review. A mere statement of the facts, the formulations and the patent claims is all that is printed in the following pages. For complete information, the reader should obtain a copy of the patent for his own files. These may be obtained at ten cents a copy from the U. S. Patent Office, Washington, D. C., or from the Stewart Research Laboratory, 1430 New York Avenue, Washington, D. C.

IN making a patent search of the wrinkle finish branch of the metal finishing industry, one soon finds out that such names as Chadeloid Chemical Co., The Kay and Ess Chemical Corp., the American Cyanamid Co., and New Wrinkle, Inc., are those most frequently encountered. However, upon further investigation, it is also found that practically all of these patents were subsequently assigned to New Wrinkle, Inc. In a previous section of this series of articles, the author discussed the patent arrangements of New Wrinkle, Inc. At this point, it is pretty well agreed in the paint industry and in the metal finishing industry that New Wrinkle, Inc., not only owns a great majority of the patents, but also have a very unique and highly desirable plan for licensing any manufacturer who wishes to join with them. This, the writer has found, is a rather generous arrangement.

For industrial consumers of wrinkle finishes, a publication known as "New Wrinkles in Finishing" is available free of charge. It is a house organ of New Wrinkle, Inc., the out-

side back cover of which is devoted to a list of the some 250 manufacturers who have agreements to serve as licensees under their plan. Industrial

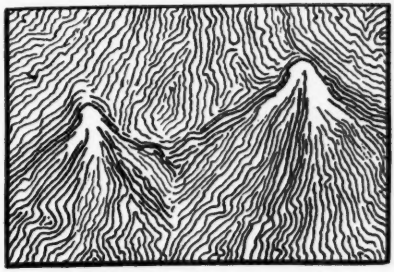


Fig. 1

consumers of wrinkle finishes, spray mechanics and writers of certain specifications should make arrangements to have their names placed on the mailing list of this publication, since it contains information of considerable value. The publication is copyrighted and lists the patent numbers of all the inventions which New Wrinkle owns in United States, Canada and England. It is also important that we remember that the words "wrinkle" and "new wrinkle" are registered trade marks and therefore great care should be exercised in their use in order to prevent legal entanglements. Let us now describe and discuss the various important patents in chronological order.

Pine-treeing is Really a Patented Design for a Wrinkle Finish

You will remember that we previously mentioned a term known as "pine-treeing" and a definition was given of this unusual condition. A search of the patent literature reveals the fact that this is really a patented design, known as patent No. 88,001, by Frank B. Root, East Orange, New Jersey. Figure No. 1 of the accompanying illustration represents an enlarged plan view of the new design. Figure No. 2 represents the same thing, except on a smaller scale. Figure No. 3 represents a cross section through the panel. The term "pine-treeing" is, without doubt, a very appropriate term for this type of wrinkle finish, as will be noted by a view of the illustration herewith.

Cleaning Block Makes Use of Wrinkle Finish

A very interesting and unusual patent discloses the use of a wrinkle finish in cleaning blocks. U. S. Patent No. 1,864,763 describes a patinized unpigmented finish for use on ornamental objects having a bright reflecting surface. The patent also claims the use of a light-reflecting tinned surface carrying the same coating of an unpigmented, single coating of a wrinkle finish. The original patent and copies of it include two illustrations. The inventors are Hal S. Cooper and Morris L. Cooper, of Knoxville, Tennessee.

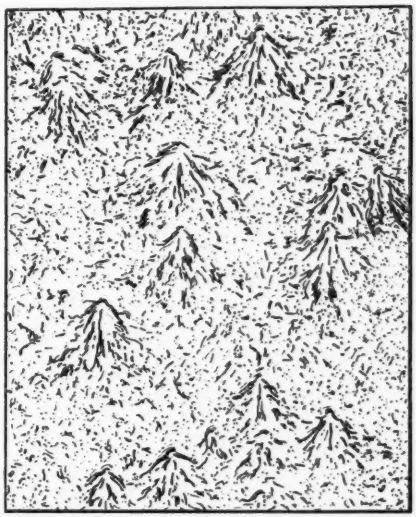


Fig. 2

Perilla and Linseed Oil Used to Produce Wrinkle Finish in the Root Process

Frank B. Root of East Orange, New Jersey, describes an interesting invention in U. S. Patent No. 1,883,408.

Fig. 3

He gives over ten examples of formulations, the ingredients of which include such familiar raw materials as Congo gum, red lead, blown linseed oil, turpentine, toluol, naphtha, Chinawood oil, rosin, kauri, manganese borate, blown soybean oil, perilla oil,

Fig. 4

cumar resin, xylol, and so on. The patent is rather extensive in its claims, giving 22 parts in the claims section. However, the most important part of the patent is the fact that perilla oil and linseed oil are the most outstanding constituents of the wrinkle finish.

Alkyd Resins Can Be Used to Produce Wrinkle Finishes

Theodore F. Bradley of Westfield, New Jersey, describes in his patent No. 1,893,611 a process for producing wrinkle finishes with alkyd resins. The invention claims the use of a highly volatile solvent and the use of an alkyd resin as the essential base-forming ingredient. Three examples of methods of formulations are described in this patent. Linseed oil fatty acids are used as the plasticizing agent. The inventor lists ten claims, all of which are a modification of the first claim, previously mentioned. Less than a month after this patent was granted, another patent identified as U. S. Patent No. 1,896,594 was issued to Mr. Root, claiming the use of Chinawood oil as the most important ingredient.

Root Also Makes Use of Rugo Resin in Wrinkle Finishes

This same inventor, within two years after his first invention, was granted a patent for the use of rugo resin to produce wrinkle finishes and is known as a wrinkle resin finish, or U. S. Patent No. 1,976,191. The inventor makes 25 claims in the patent and lists 21 examples of formulation. This is one of the most extensive patents which we searched, since it comprised about 12 full pages and described 11 various modifications of the rugo resin.

Control of Formation of Wrinkles Specified in the Toll Process

Mr. Karel Toll, Passaic, New Jersey, describes in U. S. Patent No. 1,991,527 how a wrinkle coating can be controlled by the use of various temperature ranges. In this patent, he claims the texture can be controlled by successive heating stages of increased temperatures of not less than 110 deg. F. for a relatively short

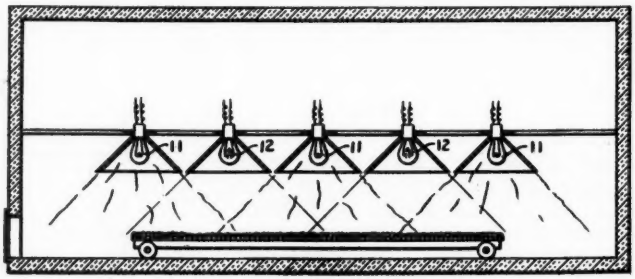
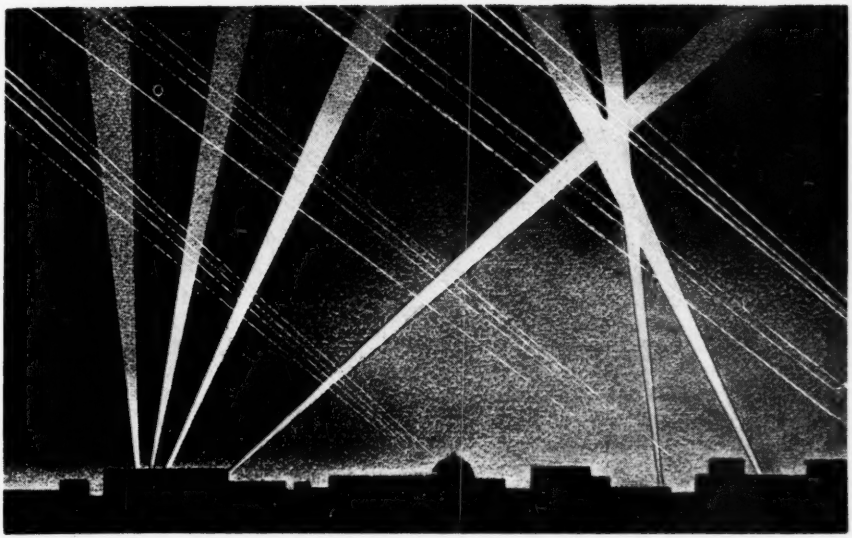


Fig. 5



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period of time in an effort to control the character of the wrinkles, and then heating the coating to a distinct

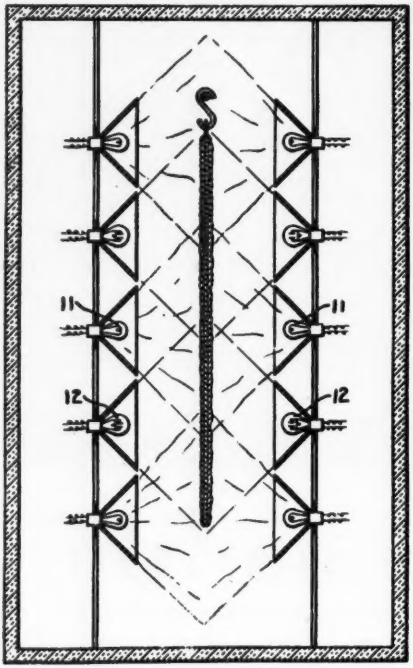

Fig. 6

heating stage at a temperature of about 200 deg. F. to set the wrinkle permanently and also harden the film. Another patent, next in numerical sequence, by the same inventor describes the use of a Chinawood oil wrinkle finish, separate portions of which have been given heat treatments at temperatures between 400 and 600 deg. F. This treatment, it is claimed, causes the formation of portions having markedly different degrees of polymerization in proportions which will yield a wrinkled finish on drying.

Howard Moore Process Used to Produce a Wrinkling Resin

Mr. Howard R. Moore of Dayton, Ohio, describes in his patent No. 2,154,954 a method for producing a wrinkling resin using a variety of raw materials. In this invention, the most important consideration is that a wrinkling resin can be formed by a mixture of vegetable oils, fatty acids and a primary resin. The vegetable oil may consist of various products such as tung oil. The fatty acids are preferably of the non-frosting type, with glycerine. The resins may be of the group consisting of modified rosin and ester gum which has been modified with phenol formaldehyde condensation products, commonly known or identified as "Bakelite" resins. The mixture is reacted at a temperature of from 480 to 495 deg. F. for 15 to 25 minutes. At this point, phthatic anhydride is incorporated and the polymerization is continued at a temperature of from 437 to 440 deg. F. Finally, the product is blown with air to aerate the product. This,

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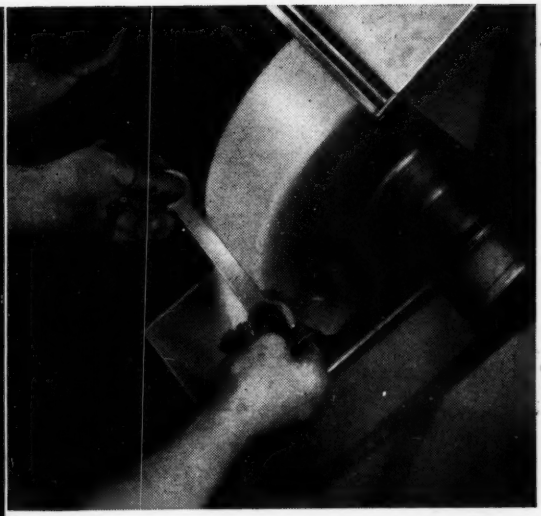

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it is claimed, gives a very suitable wrinkled finish for industrial use.

Drummond Process for Drying Wrinkle Finishes

Mr. Folsom E. Drummond of Dayton, Ohio, has a very interesting in-

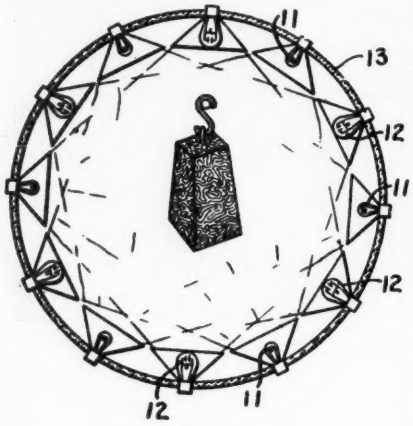

Fig. 7

vention which is described in his patent No. 2,236,398. The best way to describe this patent is to study the accompanying illustrations.

Figure 4 is a vertical sectional view of an article having an irregular or wrinkle finish thereon. Figure 5 is a vertical sectional view through an oven showing the manner of exposing the material to heat and ultra-violet ray lamps for drying coated articles. Figure 6 is a similar sectional view illustrating the arrangement for baking finishes which are applied to both sides of panels or sheets. Figure 7 is a similar view in section taken through a circular oven having heat and ultra-violet ray lamps mounted around the interior wall to concentrate the heat and light on irregular shaped articles which are to be dried to a wrinkle finish.

Figure 8 illustrates the utilization of heat lamps alone with means for admitting oxygen to enrich the atmosphere in contact with the coated article. Figure 9 is an elevation view, partly in section, of an oven showing the arrangement for admitting heated air which has been enriched with oxygen and having an oxidation catalyst incorporated therewith for drying coated articles to produce a wrinkle finish.

Bede Method for Wrinkle Coatings

Mr. James E. Bede of Cleveland, Ohio, describes in his patent No. 2,268,012 an interesting method for finishing on the production line. Es-

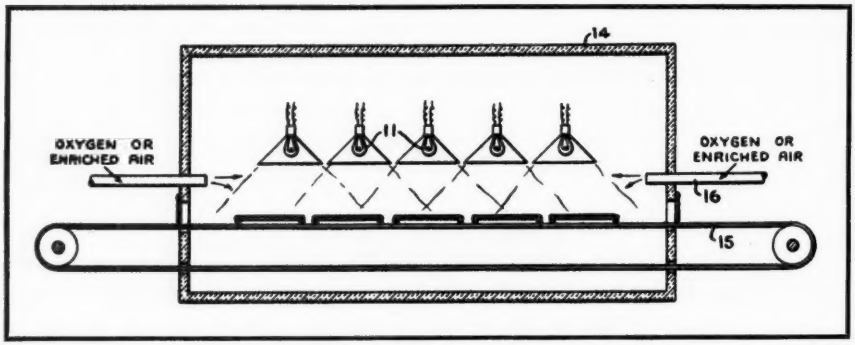

Fig. 8

sentially, the invention is an improved method of finishing metal articles consisting of the following steps,

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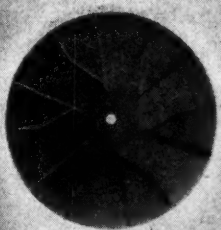

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as illustrated in Figure 10. First, the article is dipped in a coating composition (liquid wrinkle finish) with a low viscosity. Second, a spray coating of a relatively high viscosity

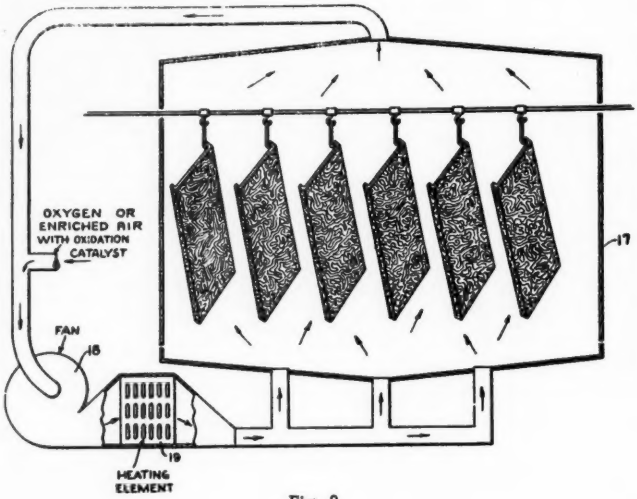

Fig. 9

wrinkle finish is applied while the first coating is still tacky. Third, the coating is baked at a temperature of approximately 150 to 165 deg. F. to produce the desired wrinkle finish.

Fine-Textured Wrinkling Finishes Produced by Waldie Process or Pigment Paste System

William A. Waldie describes in his patent No. 2,275,239 an interesting method for obtaining a fine-texture wrinkle finish, using a pigment paste. This paste is inert and consists of a grinding vehicle and a pigment such as asbestine, or a mixture of magnesium carbonate with diatomaceous earth. A colored pigment may also be used to improve the appearance. The varnish base comprises a formula employing a phenolic resin, drier, raw Chinawood oil, linseed, perilla or oiticica oil, solvent naphtha (more scientifically known as industrial xylol), toluol, and so on. The material is processed in accordance with the specifications to give a fine-textured wrinkle finish.

Drummond-Waldie Three-Step Process

By this time, we are already familiar with the inventions of Mr. Drummond and Mr. Waldie. In another patent, we find that these men are co-inventors of a new system of finishing articles with the use of wrinkle finishes. U. S. Patent No. 2,283,-420 discloses a three-step process which is illustrated in the accompanying diagram, Figure 11. The method is as follows:

Step I. The surface of the article to be finished, which has previously been thoroughly cleaned, is coated with a film of the coating composi-

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tion desired. Any of the well-known varnish or enamel formulations heretofore applied as a film and dried at elevated temperatures to produce wrinkle finishes may be used, such as disclosed in the patents to Root 1,689,892; 1,864,763; 1,950,417; 1,976,191 and Phillippi 1,878,316 and 1,936,913. The coating may be applied in any suitable manner such as by spraying, dipping, flowing or brushing the composition on the article.

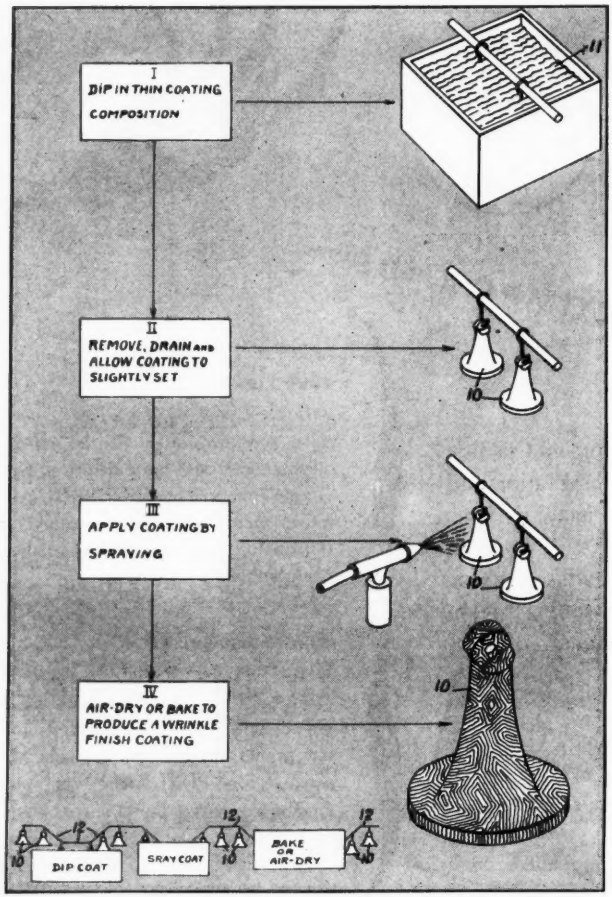


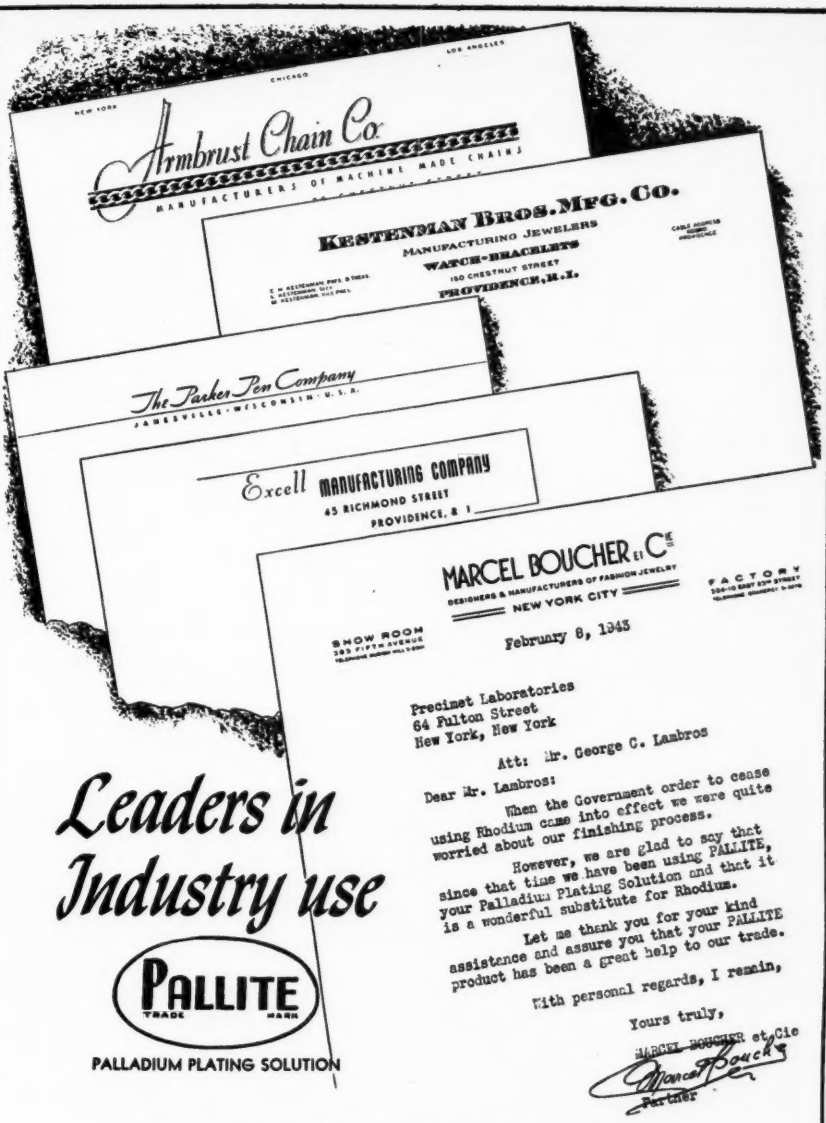
Fig. 10

Step II. Following the application of the coating composition, the article is placed under a heat lamp or suitable infra-red radiating means for from five to fifteen minutes, or, in the case of wrinkle finishes, until the wrinkling of the surface is initiated; thereafter the treatment is terminated.

Step III. The pre-infra-red rays treated finish is then allowed to air dry or is alternatively force air dried at from 85 to 250 deg. F. to produce a hard durable smooth or wrinkle finish.

Varied Textural Designs Produced Without the Use of Blown Oils

In U. S. Patent No. 2,294,703, a method is disclosed for producing a variety of designs or textures without the use of blown oils. This method was invented by William A. Waldie of Dayton, Ohio. There are extensive claims made in the patent, these numbering twenty-four. Waldie gives two excellent examples in this invention of formulation, together with formulas for three different driers and three different varnishes.


Armbrust Chain Co.
MANUFACTURERS OF MACHINE MADE CHAINS
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WATCH-BRACELETS
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Excell MANUFACTURING COMPANY
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MARCEL BOUCHER ET Cie
DESIGNERS & MANUFACTURERS OF FASHION JEWELRY
NEW YORK CITY
SHOW ROOM
FACTORY
February 8, 1943
Precimet Laboratories
64 Fulton Street
New York, New York
Att: Mr. George C. Lambros
Dear Mr. Lambros:
When the Government order to cease using Rhodium came into effect we were quite worried about our finishing process.
However, we are glad to say that since that time we have been using PALLITE, your Palladium Plating Solution and that it is a wonderful substitute for Rhodium.
Let me thank you for your kind assistence and assure you that your PALLITE product has been a great help to our trade.
With personal regards, I remain,
Yours truly,
MARCEL BOUCHER et Cie
Partner

Leaders in Industry use

PALLITE
TRADE MARK

PALLADIUM PLATING SOLUTION

PRECIMET LABORATORIES

Division of GEORGE C. LAMBROS

Research & Development Engineers in Precious Metals

64 Fulton Street New York

Essentially, the patent is an improved method of making a wrinkle finish which has the following steps.

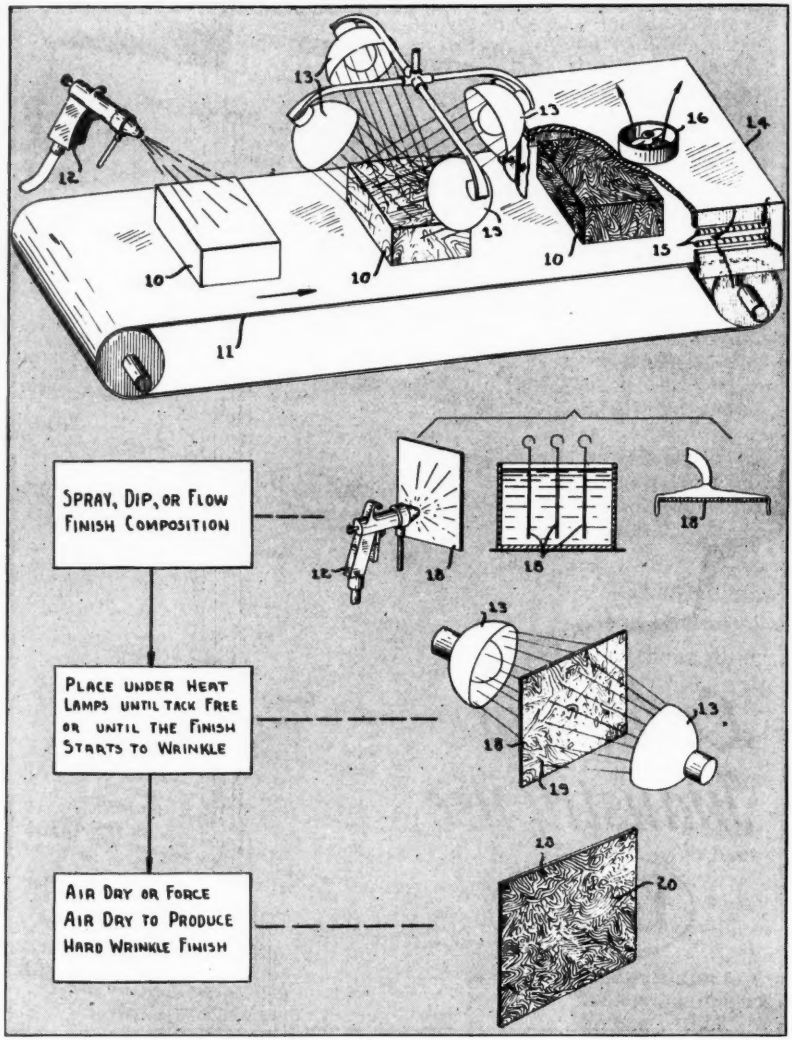
SPRAY, DIP, OR FLOW FINISH COMPOSITION
PLACE UNDER HEAT LAMPS UNTIL TACK FREE OR UNTIL THE FINISH STARTS TO WRINKLE
AIR DRY OR FORCE AIR DRY TO PRODUCE HARD WRINKLE FINISH

Fig. 11

First, one-half to three-quarters of the resin used is mixed with the total amount of oil (this may be raw Chinawood oil, raw oiticica oil, raw poyok oil, or heat-bodied linseed oil) and is heated to a temperature between 450 and 540 deg. F. The metallic drier is then added. The remainder of the resin is then added and dissolved. The

"DEOXIDIZE" for varnish finish with the

New "170" type ACP DEOXIDINE

Whether you are preparing steel artillery shell cases, or any other metal product (except zinc) for varnish or paint finish you should investigate the new "170" type DEOXIDINE. For use in a dip operation, at either high or low temperature, to remove light annealing scale—thus eliminating an extra pickling bath—and also to perfectly prepare the surface for the paint finish, all in one simple operation.

Samples and directions for use sent upon request.

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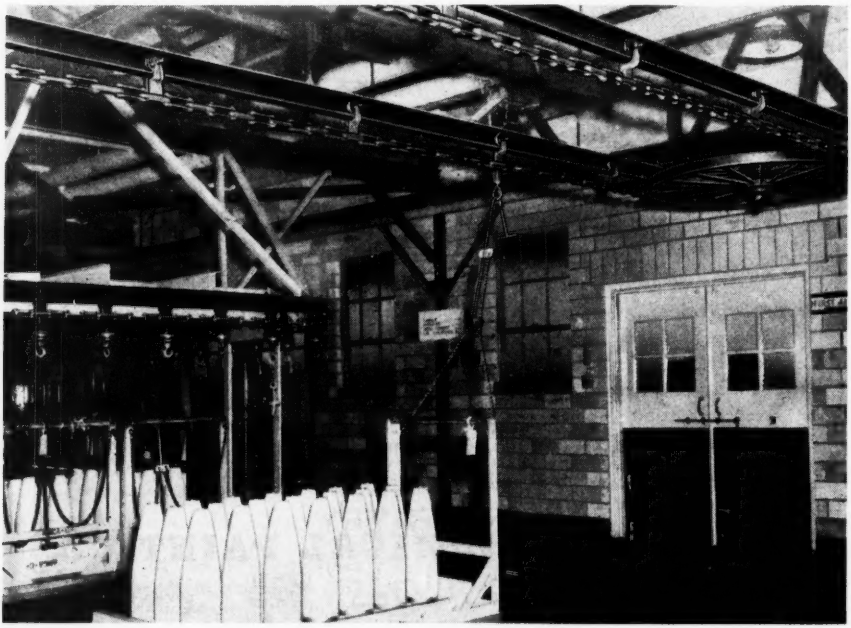
mixture is then rapidly chilled by the addition of the thinner. Sufficient thinner is later added to give the desired viscosity for spray application. Various modifications of this process are mentioned in 22 other claims of the same patent.

(To be continued next month)

Conveyors Expedite Materials Handling

DESIGNED to tow trucks loaded with any type of commodity, through sub-assembly and final assembly, this Alvey-Ferguson Truck Towing Conveyor installation is said to eliminate the hard work of pushing and the danger of sparks from electric or gasoline-operated towing equipment. Towing hooks are easily detached by hand or automatically at any pre-determined location where parts carried are processed or assembled or subjected to other operations.

The Alvey-Ferguson Trolley Conveyor shown at the lower elevation is equipped with swivel hooks used for conveying parts through automatic spray painting machines and drying ovens. The rotating pulley is so constructed that parts are mechanically turned during the painting process. Both of the conveyors were built by The Alvey-Ferguson Co., 626 Disney St., Cincinnati, Ohio.



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TO MEET THE WAR EMERGENCY

Because palladium is the only white metal remaining for tarnish resistance and decorative plating, we have devoted a great deal of research to obtain the best possible plating solution and now offer Baker Palladium Plating Solution to meet the emergency.

Baker Palladium Plating Solution is stable and *does not decompose* during use.
A flash plate, which requires no polishing, is produced in from 15 to 60 seconds.
Heavy deposits can be made from the same solution.

You can plate directly on base metal or silver for tarnish prevention.
Its stability, its uniform performance and the results obtained will justify all our claims for it. If you are using some other solution now, try Baker Palladium Plating Solution and compare results.

That's fair, isn't it?

BAKER & CO., INC.
113 Astor St., Newark, N. J.
NEW YORK SAN FRANCISCO CHICAGO

Insuring Color and Lustre in Deburring Copper and Brass Parts

By DR. R. W. MITCHELL, Technical Director
Magnus Chemical Company, Garwood, New Jersey

A GREAT many copper and brass units, such as threaded nuts, fuse parts, small screws and so on, have to be rolled in barrels for the purpose of removing burrs from edges of bores and machined surfaces. Ordinarily these parts are fairly clean as they come from the machines and do not have to be washed before the deburring operation. Usually a soft abrasive-like pumice is used, but sometimes small size granite chips and silica sand are used in the barrel as cutting down agents. In addition, a lubricant is also required to avoid scratching and marring of the metal surface during the rolling action.

Peculiarly enough, the soaps which work very well in ball burnishing operations have not always proved satisfactory here. Since the actual work of deburring is done by the cutting agent and the function of the burnishing material is to provide lubrication, it would seem that no troubles would be experienced with any good burnishing soap suited for use with copper or brass. The fact remains, however, that most of these soaps tend to give the metal a dead color and finish. Presumably the relatively small amounts of alkali freed by hydrolysis in the solution in the barrel, combined with the abrasive action of the chips and sand, cause this discoloration.

Experiments recently concluded on a full plant scale, using a new type of lubricant, have given highly satisfactory results. This material is not a soap. Instead, it is a specially prepared compound which forms with water a soap-like foam which has adequate lubricating qualities, equal to those of soap. Moreover, the solution in the barrel is mildly acid in reaction instead of being alkaline.

As a further protective measure, this mild acid action is also inhibited, so that while there is an actual acid reaction on the metal, it is so slight as to avoid any appreciable attack while aiding materially in the production of a good color and lustre. Results appear to be very good in this respect. Work which formerly came out of the barrels with a dull finish is being steadily produced with a finish comparable to that of jewelers' findings.

In using this compound, considerably more water is used in the barrel than is the case with ordinary soaps. In other words, the solution is well towards the liquid rather than the "muddy" side. One pound of the powder is used to a 15-gallon load in a 20-gallon barrel. Rolling time is about an hour at 40 to 50 r.p.m.

Randolph
Decalcomania
Lacquer No. 1096

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Silk Screen
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Plating Extends Tool Life

A METHOD of adding a paper-thin layer of chromium to worn tools and dies so they can "work thousands of hours of overtime" in the production of Army ordnance equipment was described recently by Edward J. Stone, manufacturing engineer at the East Springfield, Massachusetts, plant of the Westinghouse Electric and Manufacturing Company. This plating method, so successful that tools and gages have been reclaimed from the scrap pile and put back to useful work, has been a great salvation for over-worked machines and machine tools.

In these days when replacement parts are hard to obtain and delivery dates are so far off, salvaging tools by plating has assumed an important role in helping to maintain production quotas, Mr. Stone told the Schenectady chapter of the American Society of Tool Engineers, at a meeting at Watervliet, New York, Arsenal.

Pointing out that chrome-plated tools outlast unplated tools by as much as 20 to 1, Mr. Stone reported that plating one tool at the Westinghouse plant, instead of the frequent grinding formerly required, saved 450 pounds of critical tool steel in a year. Another tool, used on all three shifts around the clock, once had to be ground four to five times daily, slowing production for each grinding. But when plated this tool was used continuously for a week without regrinding or replating. Other examples cited were:

A forming die that once had to be refinished after turning out 25 pieces now runs off 500; life of tools for au-

Chrome-plating of worn tools, dies and gages is demonstrated by Thomas Wynne, employee at the Westinghouse East Springfield plant. He is inserting a worn gage, surrounded by wire coils, into a tank where it will be reinforced by a paper-thin layer of chromium. Plating such gages has tripled their productive capacity.

TO HIT 'EM H-A-R-D-E-R

1943 promises to be the hardest year this country has ever faced. Every effort, and every dollar of national income not absolutely needed for existence, should go into war work and War Bonds.

In the Pay Roll Savings Plan, America finds a double-barreled weapon—for fighting power today, buying power tomorrow.

You've undoubtedly got a Pay Roll Savings Plan in your own plant. But how long is it since you last checked up on its progress? *If it now shows only about 10% of the gross payroll going into War Bonds, it needs jacking up!*

This is a *continuing* effort—and it needs *continual* attention and *continual* stimulation to get fullest results.

You can well afford to give this matter your close personal attention! Actual case histories prove that a successful Pay Roll Savings Plan gives labor and management a common interest that results in better understanding. Misunderstandings and wage disputes becomes fewer. Production usually increases, and company spirit soars. And it goes without saying that workers with substantial savings are usually far more satisfied and more dependable.

For sound business economy, now and when the war is won, check up on your Pay Roll Savings Plan, *today!*

You've done your bit Now do your best!

This space is a contribution to victory today and sound business tomorrow by

PRODUCTS FINISHING

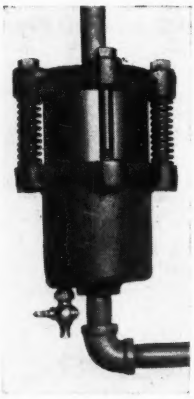
tomatic screw machines extended from one to two weeks; gages that now average 3,200 operations as compared with 1,000 before plating; a tool that once was ground twice during each eight-hour shift now is used continuously for 14 days.

Some tools can be re-equipped for many hours of production by the addition of only one to three ten-thousandths of an inch of chrome or one-thirtieth the thickness of a human hair. The heaviest plate, used principally on gages, is five-thousandths to six-thousandths of an inch in thickness, the engineer reported.

Chrome-plating cannot be applied to every tool, Mr. Stone warned. In order to produce a tool to give the required service, the plater should know what is going to be required of the tool, what material it is going to machine and what parts of the tool are going to do the cutting and have to stand the chip friction. Plating is accomplished by immersing the worn tool or die, surrounded by a coil of wire, in a solution chromic acid. A high electric current passing through the coil drives the chromium from the solution and onto the tool at the rate of one-thousandth of an inch per hour. Plating at a faster rate results in softer plate, the engineer said.

Before plating, tools and dies must be freed of all burrs, grooves or abrasive scratches by grinding, hand lapping and honing, because chromium is brittle and unless properly supported will crack, crumble and flake away. A plated burr has no strength. Tools must also be washed in baths of alkali, acid and boiling water to remove any impurities that might weaken the plate. After plating, tools are passed through a 350 degree Fahrenheit oil bath to drive out any hydrogen absorbed during the plating process.

AVOID WASTE and SPEED UP PRODUCTION



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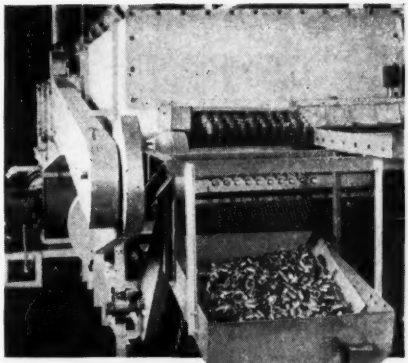

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Finishing Facts

Soluble Nitrocellulose

BECAUSE the supply and demand situation on soluble nitrocellulose has eased, the War Production Board has revoked General Preference Order M-196, governing this material.

The supply of raw materials for the manufacture of prime soluble nitrocellulose is relatively good and manufacturing capacity is adequate, the Protective Coatings Section of the Chemicals Division, WPB, stated. Augmenting the supply of prime material are considerable amounts of scrap which can be used in the protective coatings field.

In view of the comparative adequacy of the supplies of nitrocellulose, the Protective Coatings Section felt that the continuance of allocation control exercised by this order was not justified when compared with the saving of clerical work to industry.

Soluble nitrocellulose is used for lacquer, coated textiles, photographic film and plastics both for military and civilian items.

Fluxes for Hot Dip Coating

DUE to the necessary restrictions on the use of tin and zinc, the use of lead alone (and also alloyed with small amounts of tin or zinc or both metals) is being advanced as a replacement coating for hot galvanizing and hot tinning. Alloys of lead and tin have been used as folders and as terne and other dipping coats. Today, the trend is to use alloys containing 90 to 95 per cent lead, with either tin or zinc or both metals making up the balance. Small amounts of antimony, bismuth or silver may be added for different reasons. Some instances are reported of the use of lead alone successfully as a substitute for hot galvanizing pole line hardware parts.

The No. 20 Flux and Fas-Tin Flux made by the Hanson-Van Winkle-Munning Co., Matawan, N. J., are said to be suitable for these various kinds of hot coating baths. The operating temperature in each case determines the flux to use. Operations at 800 to 850 deg. F. (the galvanizing range) require No. 20 Flux. In either case, the procedure in use is the same as in conventional hot galvanizing or hot tinning, but due to the high lead content and certain characteristics of lead itself, several operating details will have to be learned by the workers.

High lead alloys have been developed, such as "Plate-Loy" to replace the zinc bath in hot galvanizing. No changes in process or materials are required other than the substitution of the new alloy or zinc. Galvanizers now using No. 20 Flux are advised to continue its use. The use of 100 per cent lead to replace hot zinc is somewhat more complicated than the above there is no alloying or bonding element present.

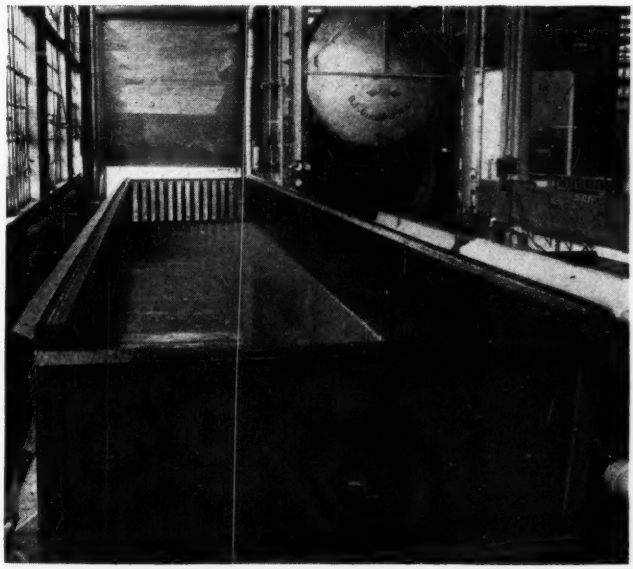
A series of lead-tin alloys varying

from 90 per cent lead and 10 per cent tin to 99 per cent lead and 1 per cent tin is available, which can be applied by regular hot galvanizing or hot tinning practice, but at temperatures between 650 and 750 deg. F. Amaloy is a typical example. The Fas-Tin Flux has been used with such alloys in the manufacture of finned tubing, air conditioning units, and in coating copper wire prior to insulating.

Koroseal Lining Bonded to Tank

A METHOD of bonding solid sheets of Koroseal directly to the welded steel, wood, or concrete of tanks, and thus extending the application of tank linings into fields which rubber cannot handle because of physical limitations is announced by The B. F. Goodrich Company, Akron, Ohio.

Koroseal is a plasticized polyvinyl chloride used in many places where its qualities are said to be superior to those of rubber. It is a synthetic elastic material with many rubber-like properties. The principal advantage of Koroseal in tank lining is its remarkable corrosion resistance because of the inertness of its compounds to strong corrosives such as chromic and nitric acids, which have a deteriorating effect on rubber.



Koroseal-Lined Tank

Chemical Products Reclamation Program

THE Salvage Division of the War Production Board has announced an extension of its chemical products reclamation program, designed to make sure that no valuable chemical resources, such as solvents and cleaners, cutting and lubricating oils, paints and chemical by-products, go down the sewer.

In order that they may help plants to improvise equipment for capturing and salvaging chemical products that would otherwise be wasted and lost to further war use, the Industrial Salvage Branch of the War Production Board has begun a study designed to locate important chemical reclamation opportunities. One thousand large users of chemical products, including manufacturers of munitions, aircraft, heavy machinery, engines, chemicals and plastics, have been asked to report briefly on their chemical products reclamation practices.

Among the chemicals which can be recovered or reclaimed in significant quantities, and their uses, are the following:

1. Carbon tetrachloride, trichlorethylene, and ethylene dichloride used in dipping, vapor degreasing, pressure and other cleaning operations.
2. Lubricating oils, cutting oils, hydraulic oils.
3. Naphtha, thinners, solvents and alcohols used in the manufacture of paint, lacquers and varnishes.
4. Toluene, needed for TNT, pharmaceuticals, rubber solvents.
5. Benzol, needed for gasoline, synthetic rubber, plastics and dyes.
6. Ethyl alcohol, employed in explosives, solvents, rubber and antifreeze mixtures.
7. Butyl alcohol, needed for plastics, photographic film, metal cleaners, rayon, lacquer solvents, and artificial leather.

There are many war essential chemicals which cannot be practically recovered for re-use in their original form. Nevertheless, effective conservation can be accomplished by proper salvage methods applied to what is normally considered scrap. Included in this category would be:

Paints and lacquers—Sludge from spray booths properly processed and re-used will extend the usage of such critical materials as glycerine, phthalic anhydride, phenol, which many times are present in the form of paint vehicle.

Plastics—The excess from a molding or extrusion operation in the form of flashing, trim, and so on, can be re-worked for many uses, thereby effectively utilizing to the maximum the raw materials employed in making the plastics, such as ammonia, calcium carbide, phenol, formaldehyde, and other critical chemicals.

S. Donald Perlman, chief of the Chemical Resources Section of the WPB Industrial Salvage Branch, is in charge of the study of chemical products reclamation in 1,000 plants.

Ruling on Essential Activities

ELECTROPLATING, enameling, japanning, lacquering, plating, polishing, rust proofing and metal finishing have been ruled essential activities according to Activity and Occupational Bulletin No. 14 of the Selective Service System, Washington, D. C. Essential occupations are: electroplater (all around), galvanizer (all around), employment and personnel manager, production manager, and maintenance mechanics. Companies who have men in these posts who cannot be replaced may request draft deferments for them from their local draft boards.

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HELP THE AXIS POWERS

Plating LEAD?

Write for new free booklet which describes the advantages of lead plating with Harshaw Fluoborate Solution Concentrate.

THE HARSHAW CHEMICAL CO.
CLEVELAND, OHIO AND PRINCIPAL CITIES

Speed Welding Production

with Steel-Grip one-piece-back welders' gloves

Specially designed Steel-Grip Welders' Gloves give extra protection against heat and wear. Keep production "rolling." Entire back cut in one piece from special tanned heat-resistant leathers. No seams in back. No burned-through or ripped seams. Wool heat breaker lining inside back for added protection. Finger seams welted at points of greatest wear. Wide strap thumb reinforcement. Try a pair. Only $1.85. Outlast other gloves. Order No. 13475 now from jobber or direct. 10% discount on 12 pair lots. Write for welders' clothing catalog.

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SPEEDS WARTIME OUTPUT

• In plants throughout the nation, HOWARD mass production cleaning equipment speeds output of shells, torpedoes, guns, tanks and aircraft. HOWARD engineering skill can help you meet or beat wartime schedules . . . conserve vital manpower . . . maintain stiff military quality standards. Equip your plant with the latest in HOWARD methods and machinery — clean metal parts thoroughly, faster and at lower cost per unit. Write today for details.

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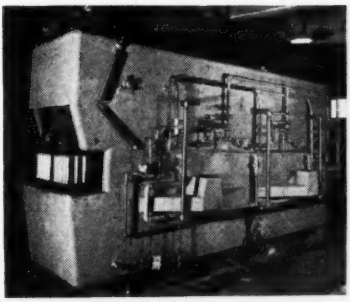

HOWARD Conveyor-Type Pickling Machine. Engineered to pickle 2000, 40mm shell cases per hour.

HOWARD ENGINEERING & MFG. CO.

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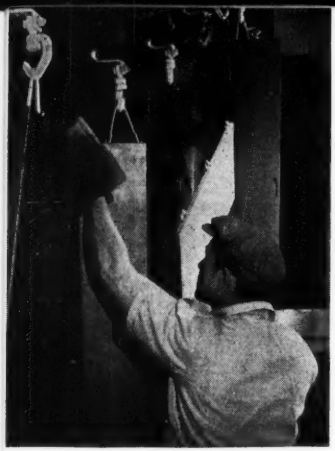
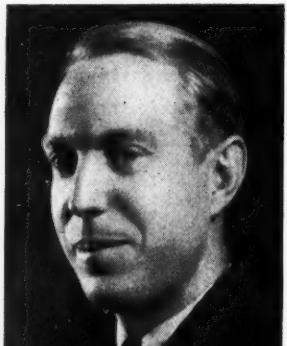


News OF THE INDUSTRY

Edward F. Berry Company Formed

E. F. Berry has resigned from the Udylite Corporation and announces the formation of his own company to be known as the Edward F. Berry Company, 6432 Cass Ave., Detroit, Mich. The new company will handle a complete line of supplies for plating, polishing, anodizing and metal finishing.

Ed Berry has been associated with the metal finishing industry since his graduation from the University of Pittsburgh in 1926. He was employed by the Aluminum Company of America, New Kensington, Pa., as research chemist and later was editor of "Metal Cleaning and Finishing" publication. He joined the Udylite organization in February, 1932, when that company was just entering the field of plating and polishing supplies and equipment. He has been closely associated with the development of Udylite products since 1932.



Edward F. Berry

Manager Appointed for Magnus Wire Coating Division

The Magnus Chemical Company, Inc., Garwood, N. J., announces the appointment of Mr. H. L. Trembicki as manager of its newly organized Wire Coating Division. Mr. Trembicki has had a wide range of experience in the metal working and wire drawing industries.

As manager of the Wire Coating Division of the Magnus Chemical Company, Mr. Trembicki will specialize in servicing the wire and steel industries with a new process for drawing wire without the use of lime, which will also be extended to include deep drawing of steel and other metals.

Rohleder Made Factory Superintendent at Maas & Waldstein

Charles F. Rohleder has been appointed factory superintendent of Maas & Waldstein Company, makers of industrial finishes, Newark, N. J. Mr. Rohleder, who has held the position of

chief chemist of Maas & Waldstein since 1937, was graduated from Cooper Union, New York City, in 1926 with the degree of B.S. in chemistry. All his professional life has been spent in the industrial finishing field and his experience includes research, production control, and supervision of production.

Robert S. Moore Joins Quaker Research Staff

Quaker Chemical Products Corp., Conshohocken, Pa., has announced that Robert S. Moore, a native of Canada, has recently joined its research staff. Mr. Moore received his M.S. degree from the California Institute of Technology and has been employed by the oil industry on the West Coast until coming with Quaker.

The already extensive laboratory facilities of this company are now being further enlarged by an addition to the research laboratory. This building will house laboratory offices, a library and conference room where the technical and chemical aspects of various problems can be discussed. An addition to the executive and administrative office building is also under way.

Chemical Exposition Dates Announced

Dates for the 19th Exposition of Chemical Industries have been definitely set for the week of December 6 to 11, 1943, according to an announcement made by Charles F. Roth, manager of the Exposition. Ninety per cent of the companies responding were enthusiastic for the holding of the Exposition. These were exhibitors in the 1941 Exposition held in New York.

This year Madison Square Garden will be the scene of the event instead of Grand Central Palace. All exhibition space will be on one huge floor. However, the actual amount of space available will be approximately one-half of that of the 1943 Exposition which was held in the Palace.

Industrial exhibitions of the character of the Chemical Exposition have proved most helpful in the war effort in many ways. As in peacetime, it brings about an interchange of ideas and solves many problems. Exhibitors welcome it as an aid in post-war selling and distribution of their products which will be available when their war efforts have terminated. Getting more from present equipment through efficiency and making it last longer will be factors in the Exposition program.

A diagram of floor plans is now being prepared and will be available soon. Copies can be had from the International Exposition Company, 480 Lexington Ave., New York, N. Y.

Army-Navy "E" Awarded to Sarco

Sarco Company, Inc., 475 Fifth Ave., New York, N. Y., announces the award of the Army-Navy "E" for excellence in war production to their Bethlehem, Pa., plant on April 22nd. The plant is engaged exclusively on production of steam traps, temperature control, and heating specialties, used widely by the Navy and by the Army in camps, air bases, on mobile laundries, engine test sets, and so on.

Park Chemical Promotes L. M. Harris

Appointment of L. M. Harris as general sales manager of the Park Chemical Company, 8074 Military Ave., Detroit, Mich., is announced by F. Lloyd Woodside, president. The appointment, Mr. Woodside said, is an intra-organizational promotion, Mr. Harris having been sales manager of the automotive division of this industrial chemical manufacturer since 1939.

Mr. Harris entered the automotive industry in 1919 and has served in various executive capacities in the accessories field, as district manager for Willys-Overland, and as a retailer.

BETTER PLATING, LESS COST!
"MGC" ELECTROPLATING EQUIPMENT
Write for Interesting Details TODAY!
MOTOR GENERATOR CORP., HOBART SQ. BOX #63 TROY, OHIO

New PLANT EQUIPMENT AND Materials

Howard Continuous, Drum-Type Pickling Machine

Designed to meet the need for increased production of shells, a continuous, drum-type pickling machine for high-speed cleaning of shell cases has been developed by Howard Engineering & Manufacturing Company, 1838 Freeman Ave., Cincinnati, Ohio. The machine is designed to conserve vital manpower and critical materials, as well as to speed pickling output.

It is claimed that actual operations reveal the machine is capable of pickling a maximum of eight thousand 37-mm. shell cases per hour. Parts to be cleaned travel through the machine in a drum which varies in diameter between sections, so that each section of the drum runs in its particular tank. Scale is removed from annealed parts by successive pickling, rinsing, neutralizing and rinsing operations. A variable speed drive provides for necessary changes in the pickling time.

An important and economical feature of the machine is its operation without the use of pumps. Acid, rinse and neutralizing solutions are picked up by scoops on the side of the drum and are dumped by the scoops on the parts. This method is said to substantially reduce consumption of acid, expedite delivery and conserve critical materials.

The machine illustrated is 35 ft. long, 8 ft. wide and 9 ft. high. To withstand acid corrosion, the pickling and first rinse drums are made of monel metal and the tanks are lead-lined. The machine is available in special sizes and can be adapted to the pickling of parts other than shell cases.

Howard Continuous, Drum-Type Pickling Machine

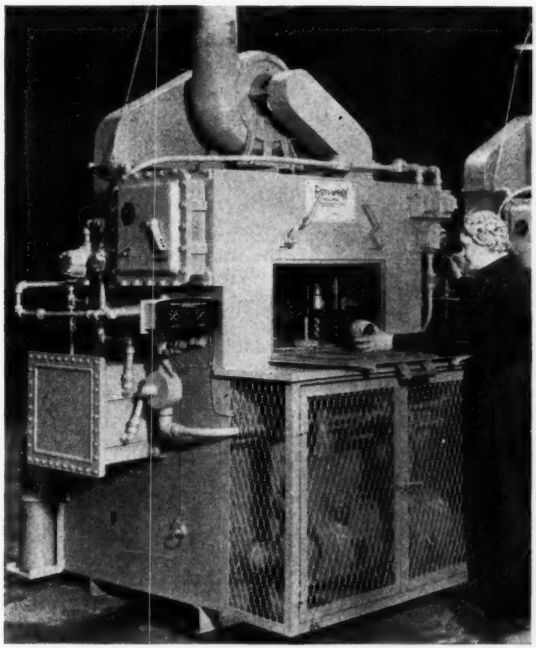
"Rotospray" Washing Machine

Industrial Washing Machine Corporation, 291 Burnet St., New Brunswick, N. J., has placed on the market the Rotospray Washing Machine shown in the illustration. The machine consists of a rotating mesh turntable 2 ft. or larger in diameter, housing, pump, motor and spray system. The parts to be cleaned are placed upon the mesh turntable, the door closed and quick-opening valve turned which allows the cleansing solution to spray upon the work. As the parts are sprayed, a gearhead motor rotates the turntable in order to expose all sides of the work to the spray action which is directed by specially machined nozzles from the top, sides and bottom.

After the work has been cleaned, it can be rinsed with fresh water if so desired. This fresh water does not drain into the solution tank, but passes directly to the sewer by means of a tilting drain plate which is coupled to the fresh water valve handle.

Only one inexperienced operator (either male or female) is needed to operate the machine. Easily cleaned work can be cleaned in a few minutes; a more difficult job can be left in the cabinet 15 or 20 minutes. The machine only requires 6 x 5 ft. floor space. Any of the cleaning detergents now on the market can be used in the machine.

Machines of this type are now being used to clean such parts as ball bearings, large castings, crankcase parts, nose sections, large cams and gears, impeller shafts, Diesel engine blocks, and so on. The machine pictured here is intended for use with kerosene — hence the explosion-proof switches and wiring and built-in CO_2 fire protection system.



"Rotospray" Washing Machine

Infra-Red Reflectance Standards

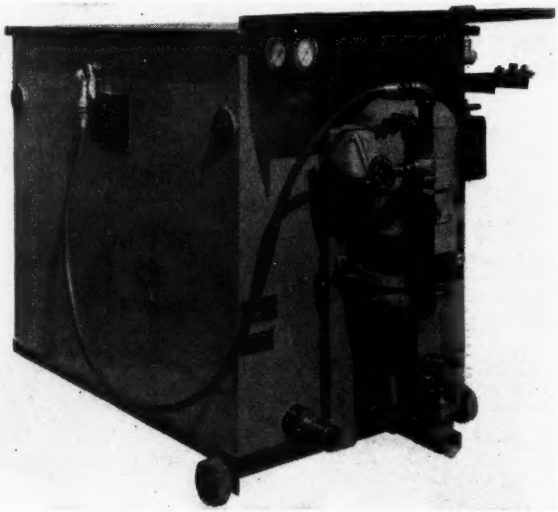
Inasmuch as many government paint specifications call for infra-red reflectivity, Stewart Research Laboratory, 1340 New York Ave., N. W., Washington, D. C., has made available infra-red reflectance standards to meet the demand. The standards, which are furnished in sets of three, are permanent and washable. They are made of metal and are coated with durable baked enamel. The three standards correspond to the three levels of infra-red reflectance used in U. S. Army Specification No. 100-12, which are as follows: Panel No. 1, 24.7 per cent; Panel No. 2, 37.4 per cent; Panel No. 3, 56.6 per cent.

The standards are calibrated for the Wratten 89-A filter and are said to be accurate to plus or minus 0.5 per cent. They can be used for direct photographic comparison or for reflectometric measurements.

With every set of panels, there is included a pamphlet giving a full explanation of the standard procedures for measuring infra-red reflection. Also included are procedures for the proper use of the Stewart Infra-Red Reflectance Standards.

Magnus Portable Washing Machine

The Washing Machine Division of Magnus Chemical Company, 208 South Ave., Garwood, N. J., announces a portable multi-purpose washing machine for cleaning a wide range of large and small metal parts. The machine, which is being manufactured in three sizes, is designed and built to meet the needs of metal fabricators whose production rates do not warrant the installation and use of large, fully automatic washing equipment.



Magnus Portable Washing Machine

The machine has several outstanding features. Being portable, it can be moved to the point of production where it is needed. The parts to be cleaned may be handled by three methods: if small or delicate, they are handled in bulk (in baskets); if large, they are handled individually on the lower platform, or they may be hung on racks in the solution.

The parts to be cleaned may be either soaked and agitated in baskets or on the lower platform; or sprayed with cleaning solution by means of a pump and spray gun; or both—that is, soaked in the lower section of the machine and rinsed at the upper level by means of a flush gun. The machine provides agitation of the parts by an up and down motion, 30 eight-inch movements per minute.

Several types of cleaning solution may be used. The machine is well adapted to the use of an emulsifiable cleaner such as Magnus Emulso-Dip Cleaner. It is equipped with immersed electric heating units, thermostatically controlled, for use with hot alkaline solutions. It may also be adapted to the use of chlorinated solvents.

The machine is available in three sizes: small, 24 x 18 x 40 in. high; medium, 36 x 40 in. high; and large, 48 x 30 x 40 in. high.

Sol-Speedi-Dri

A soluble oil and water absorbent to be known as "Sol - Speedi - Dri" has been placed on the market by Waverly Petroleum Products Co., Drexel Bldg., Philadelphia, Pa. Sol-Speedi-Dri is intended for use wherever oil and water, soap and water, or graphite and water cause slippery floor conditions in industrial plants. When Sol-Speedi-Dri is spread along the aisles and generously banked about machines, it is said to provide an anti-skid surface and dry up the floors. It also reduces the hazard of fire. It is especially recommended for use in arsenals, munition plants, chemical plants, and other plants where acids and soluble oils are used.

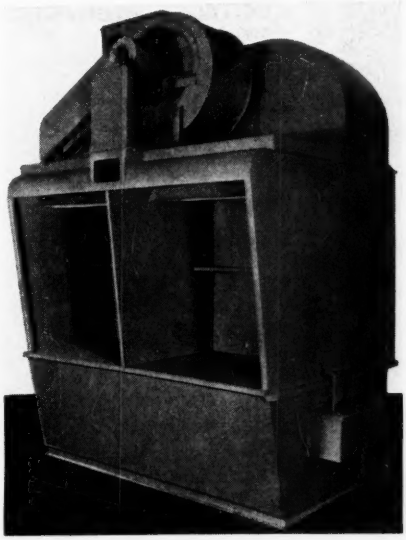
Sol-Speedi-Dri is the companion product of "Speedi-Dri," a mineral oil and grease absorbent.

Hydro-Whirl Dust Collector

Especially designed for use in the processing of magnesium, a dust collector having only one mechanical moving part—a fan unit—has been added to the line of Hydro-Whirl dust collecting equipment marketed by Industrial Equipment Corp., 628 E. Forest Ave., Detroit, Mich. The unit is available for use either as a booth type collector or

individual collector for grinding stands.

In use, the dust-laden air is drawn through an orifice in the collector, thereby causing a violent spray of water. The dust is then "water-whirled" out



Hydro-Whirl Dust Collector

of the air and directed down into a tank below where it forms a sludge which can be easily removed. Since the operation of the Hydro-Whirl permits the cleaned air to be returned to the room, heat loss is said to be reduced to a minimum.

Schmieg Integral Dust Collector and Grinding Bench

A four-station grinding bench with integral dust collector has been developed by Schmieg Industries, 352 Piquette Ave., Detroit, Mich. The unit is designed for use with portable grinders on non-hazardous materials.

The unit is said to effect full protection against dust hazards incident to grinding operations. High velocity suction is concentrated at the dust source by means of flexible suction hoses attached to swivel connections. A special double-width, double-inlet fan is said to assure complete collection of dust.

GLOBE
Finishing • Tumbling
BARRELS

The Globe complete line of finishing tumbling barrels has had the acceptance of industry for more than 40 years.

GLOBE DIRECT MOTOR DRIVE, TILTING, TUMBLING BARREL.

(Right)—Speeds as low as 30 r.p.m. Developed to produce fine finishes on non-ferrous parts. No nicks or scratches. Quality built with compactness. Available with wood, steel or cast iron shells.

No. 6 HORIZONTAL FOUNDRY BARREL.

(Right) — Ruggedly constructed for heavy duty work such as removing fins and flanges from castings. Available in varied sizes with tight and loose pulleys or motor drive as shown.

COMPARTMENT BURNISHING BARREL.

(Right) — Performs up to three jobs at once, speeding production. Exceptionally strong and durable. Large door opening facilities loading and unloading. Belt or motor driven.

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THE GLOBE MACHINE & STAMPING CO.
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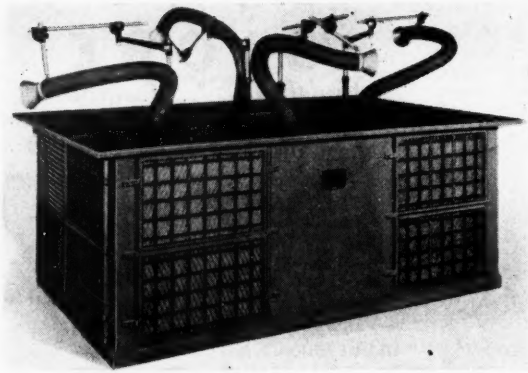

Schmieg Integral Dust Collector and Grinding Bench

The finer particles are removed by filters, while a special plenum chamber is provided for the removal of heavy particles.

The bench is of rugged wood frame construction, permitting the attachment of grinding heads and fixtures, and is equipped with a heavy wood top, Masonite covered. Variations in design are available to suit production requirements, each unit being engineered for the particular job it is designed to do. The unit is furnished complete with fan, four suction hoses, and motor with combination starter and push button.

Taber Shear-Hardness Attachment

Announcement of a shear-hardness attachment for the Taber Abraser has been made by the Taber Instrument Corporation, 111 PF Goundry St., North Tonawanda, N. Y. The attachment is said to provide an accurate method of measuring the toughness quality of surface finishes and their ability to resist digs, scrapes and similar abuse from actual service not considered normal wear.

A weight slides along the caluibrated beam until it is finally located in the

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MASKING STICKERS
Come in the exact sizes and shapes you need. Simply press on—peel off. No moisture required. Sharp, non-curling edge.
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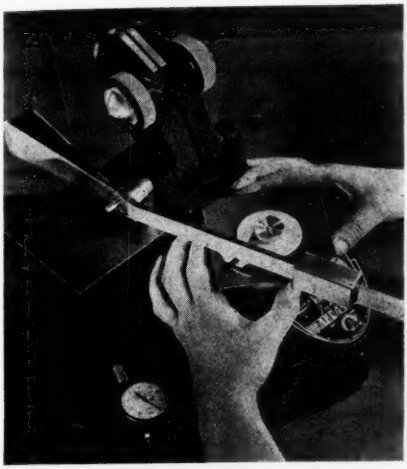
PRE-CUT MASKING STICKERS

position where the correct load permits the tool point to cut a groove in the surface finish without digging through to the base plate. Several grooves are made in the surface and the most representative one is selected to measure to the nearest thousandth of an inch. A special Taber Micrometer is furnished



Taber Shear-Hardness Attachment

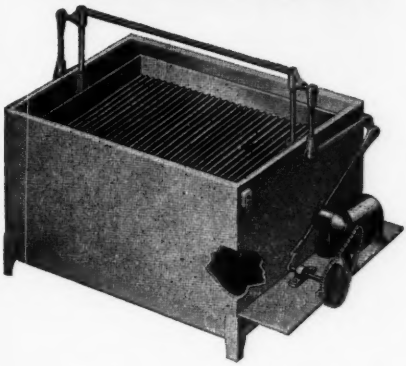
to make the measurement. The shear-hardness of the specimen is calculated by taking the reading from the calibrated beam at the forward edge of the adjustable weight which, together with the width of the groove, determines the result by a mathematical formula. Only a small 4-in. square sample is required to make this easy, quick test.

In addition, the Taber Abraser is said to evaluate efficiently and accurately the resistance of surface finishes to rubbing abrasion. Scientific wearing action by "Calibrase" wheels on the specimen clamped to the revolving turn-table is measured in terms of "wear cycles" which are automatically totaled on the built-in counter.

Universal Air Filter

Due to a misinterpretation published by this department in our May issue, we inadvertently described a new principle of air filtration in a manner which might be misleading to many of those

METAL PARTS CLEANING
Low Cost -- Efficient



"STURDY-BILT" *Simplex*
METAL PARTS CLEANER

A small compact, mechanically simple unit that combines a time proven method with a simplified action. Metal Parts, Assemblies, Shells, Cartridges, Castings, Stampings, etc., can be thoroughly cleaned in much less time.

Operator simply loads tray—presses a switch and the "Simplex" does the rest. Can be installed in different departments or in a series for consecutive steps of cleaning, rinsing, coating or treating.

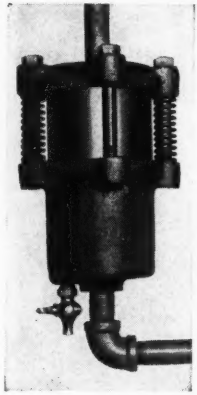
Write for complete information.

STURDY-BILT EQUIPMENT CORP.
DEPT. P-6 **WEST ALLIS, WISCONSIN**

Also manufacturers of "Sturdy-Bilt" Soaker-Hydro continuous production metal parts cleaners.

who read the item about Universal Air Filters.

Universal Air Filters actually filter compressed air through minute pores of a manufactured stone, thus removing oil, water and foreign material from compressed air and gas lines.



Universal Air Filter

The manufacturer claims these filters will supply air for every conceivable process where compressed air is used. These filters can be furnished in two types, namely, the Universal Air Filter which includes six standard sizes and the Universal Paint Spray Unit which can be furnished in two standard sizes. It is claimed that this is the original compressed air filter using a manufactured stone as a filtering medium.

A four-page illustrated folder on this product can be had simply by addressing the Universal Filter Company, 7025 Manchester Ave., St. Louis, Mo., manufacturers of the product.

Pebble-Tex

The Egyptian Lacquer Manufacturing Company, Rockefeller Center, New York, N. Y., announces a wartime rough metal finish called "Pebble-Tex."

Coarse and fine texture are shown in the upper and lower Pebble-Tex panels respectively. The size of the pattern is regulated by spray gun adjustment and application technique.

The finish is being used on parts for radio equipment for military use, instrument panels, fire control and listening devices, and other service items requiring a texture high speed metal finish. For full protection, it is recom-

in drying all types of plated parts

A one-man drying outfit that gives greater speed, improves quality, cuts costs of drying plated work and lacquering small parts. All steel construction. ¾ H.P. motor. V-belt drive. Requires minimum floor space. Auxiliary heating unit available.

Write for complete information and prices.

DELLINGER MFG. CO., 729 N. Prince St., Lancaster, Pa.

KREIDER
Centrifugal Dryer

"STEP UP PRODUCTION"
McKeon's
"Liquid Sulphur"
FOR STRIPPING COPPER
Five simple steps to efficiency.
Sample FREE
SULPHUR PRODUCTS CO.
GREENSBURG • PA.

mended that Pebble-Tex be applied over a primer, but the pattern may be obtained with a single application on the bare metal.

The illustration shows two panels which were finished in Egyptian Pebble-Tex. Both the rough and fine texture and varying degrees in between may be obtained from the same mix by gun adjustment and application technique. Pebble-Tex is available in a variety of colors and is also recommended by the manufacturer for essential civilian articles requiring a rough finish.

Steel Grip Gauntlet for Heavy Duty Handling

The illustration shows an improved type steel reinforced gauntlet for heavy duty handling which has been placed on the market by Industrial Gloves Company, 746 Garfield Blvd., Danville, Illinois. Although heavily reinforced, the glove is flexible because grain leather is used. Steel ribbons are placed diagonally to assure utmost protection against cutting edges of material handled.

The entire palm, extending up the first joint of all the fingers and well around to the back of the forefinger, is reinforced with an extra piece of

Steel Grip No. 12725 Gauntlet

leather. The thumb is patched and strapped for extra strength and service. All closing seams are stitched with steel thread, making the glove practically rip-

GET Jewelry COLOR and FINISH ON YOUR DEBURRED COPPER and BRASS PARTS

Are you having trouble with the color and finish you get after rolling or "deburring" your copper and brass machined parts? If ordinary compounds give you a "dead" color and finish, try

MAGNUS BRIGHT BURNISHING POWDER

About a pound to a 15-gallon load in a 20-gallon barrel is all that is required. You get color and finish like a piece of jewelry. Just the right amount of lubrication is provided, plus a very mild, completely inhibited acid action which does not harm the metal.

We will be glad to send a sample of Magnus Bright Burnishing Powder for test in one of your barrels.

ASK ABOUT THE MAGNUS LINE OF BALL BURNISHING COMPOUNDS

Magnus makes a complete line of ball burnishing compounds, each especially designed to do a better, faster job on the type of metal involved and the kind of finish required. Ask for information on the Magnus compounds needed to improve your production quality and speed.

MAGNUS CHEMICAL COMPANY

Manufacturers of Industrial Cleaning Materials—Washing, Drying, Pickling Equipment—Metal Drawing Lubricants.

208 SOUTH AVENUE GARWOOD, N. J.

SERVICE REPRESENTATIVES IN ALL PRINCIPAL CITIES

Magnus CLEANERS-METHODS-MACHINES

proof. Gloves may be ordered as pairs, all rights, all lefts, or any combination of rights and lefts as required.

Curran Dunking and Dryer Basket

The Curran Corporation, Malden, Mass., has announced a dunking and dryer basket made entirely from scrap metal. This dunking basket kit is said to be extremely practical, since it is included with a standard five-gallon steel shipping pail containing Curran "Carbon Met" substitute for carbon tetrachloride.

The kit is shipped complete and is easy to use; all that is necessary is to place the part to be cleaned in the dunking basket and it bursts into the volatile Carbon Met. When the dunking basket is withdrawn, the spring-like clips on the sides of the basket attach themselves to the edge of the container, allowing excess solvent to drain back into the pail. Within a few minutes, the parts in the basket are completely dry and clean.

Curran Dunking and Dryer Basket Kit

SALESMEN: Selling Metal Cleaning Equipment, Sturdy Bilt Corporation, West Allis, Wis.

SOL-KLEAN
for
Better Paint Adhesion
INDUSTRIAL CHEMICAL PRODUCTS CO.
DETROIT
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NALCO DRITHERM
CARBON FILAMENT LAMPS
Best For Infra-Red Ray Drying
Nalco Dritherm Lamps are the carbon filament type...proved for years in therapeutic and industrial practice as providing maximum emanation of infra-red ray within the desirable penetration band. Made only by—
NORTH AMERICAN ELECTRIC LAMP CO.
1020 Tyler Street St. Louis, Mo.

Wil-Son "Heavy Duty" Infra-Red Drying Tunnel

The Wil-Son Mfg. Corp., Infra-Red Division 56, 154 W. Erie St., Chicago, Ill., has placed on the market a "heavy duty" infra-red drying tunnel for exceptionally large installations. In this tunnel the lamps have been brought closer together and are staggered in such a way as to give an extremely even heat distribution pattern. New dual pipe standards are installed at each end of the tunnel section to provide maximum stability.

An outstanding innovation is the way in which the lamps can now be cleaned while the tunnel is in operation. The cleaning is done by unscrewing one bulb at a time from the rear, wiping off the dust, and screwing the lamp back in place or replacing it with a cool spare bulb. This feature is said to sim-

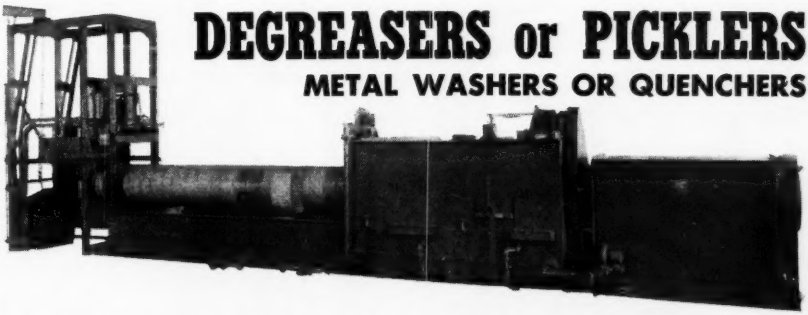
plify maintenance. The illustration shows the tunnel being relamped from

Wil-Son "Heavy Duty" Infra-Red Drying Tunnel

the back without stopping production. Due to heavier construction than previous models, the heavy duty tunnel is made in sections having as many as 16 lamps per row, a total of 112 lamps per section. It is claimed that the reflector lamps used with the tunnel eliminate two-thirds of the radiation loss due to dirt. The lamp has a metallic reflector applied to the inner surface of the bulb which is hermetically sealed in where it is free from oxidation or the collection of dust, dirt and fumes which might cause its deterioration.

Indium. An important contribution to the literature available on the subject of Indium is the annotated 1941-1942 supplement to the Bibliography of Indium which has been compiled by Maria Thompson Ludwick. The supplement is divided into the following sections: Occurrence and Extraction of the Element; Physical Properties of the Element; Qualitative and Quantitative Analysis; Alloys; Chemical Properties, Compounds and Properties of Compounds; Miscellaneous Information.

A copy of the supplement may be obtained from The Indium Corporation of America, 60 E. 42nd St., New York, N. Y.



DEGREASERS or PICKLERS

METAL WASHERS OR QUENCHERS

Whether it's Degreasers or Picklers, Metal Washers or Quenchers which you require for your war work, Blakeslee has standard or ENGINEERED-FOR-YOU equipment for your problem. Regardless of the size of your production, we have the answer in the proper type of degreasing, washing, quenching or pickling equipment.

The above illustrated machine is a continuous pickle, rinse, neutralizer and soaper for 20 mm. cartridge cases, either steel or brass. This machine will take a 2000 pound batch at one load or a continuous supply of cases. We would appreciate the opportunity of working on any problems you have.

G. S. BLAKESLEE & CO.

NEW YORK **CICERO STATION CHICAGO** **TORONTO**

THE FINISHING TOUCH — ***J. A. Patterson***

"This is Mr. Atlas, who has charge of finishing all our small parts."